REPORT RESUMES

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PRELIMINARY FACTOR ANALYSIS OF VISUAL COGNITION AND MEMORY.
STUDIES IN CINE-PSYCHOMETRY, FINAL REPORT, PART I.
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PRELIMINARY ANALYSES WERE UNDERTAKEN TO DETERMINE THE POTENTIAL CONTRIBUTION OF MOTION PICTURE FILMS TO FACTOR ANALYTIC STUDIES OF HUMAN INTELLECT. OF PRIMARY CONCERN WERE THE OPERATIONS OF COGNITION AND MEMORY, FORMING TWO OF THE FIVE OPERATION COLUMNS OF GUILFORD'S "STRUCTURE OF INTELLECT." THE CORE REFERENCE FOR THE STUDY WAS DEFINED AS THE VISUAL, FIGURAL, COGNITION-MEMORY PORTION OF GUILFORD'S MODEL WITH THE HOPE THAT DATA COULD BE OBTAINED WHICH WOULD SUGGEST POSSIBILITIES FOR SIMILAR STUDIES THROUGHOUT THE "STRUCTURE OF INTELLECT" MATRIX. INDIVIDUAL DIFFERENCES IN PERFORMANCE WERE EXPLORED ON TASKS CHARACTERIZED BY MOVING, SEQUENTIAL, AND BEHAVIORAL CONTENT, AND, IN ADDITION, A CONCEPTION OF ABILITIES AS INFORMATION PROCESSING OPERATIONS WAS SUBJECTED TO EMPIRICAL EXAMINATION. SUBJECTS WERE 100 FRESHMAN ENGINEERING STUDENTS OF PURDUE UNIVERSITY. IT WAS DETERMINED THAT THE VISUAL FILM MEDIUM CAN ACCOMMODATE FOR BRIEF DURATIONS CONTENTS CLASSIFIED AS FIGURAL, SYMBOLIC, SEMANTIC, OR BEHAVIORAL. IMPLICATIONS WERE THAT, IN FUTURE PSYCHOMETRIC STUDIES USING MOTION PICTURES, TEST ITEM CONTENT COULD BE AUDITORY, VISUAL, OR BOTH, WITH INFORMATION IN TWO CHANNELS -- EITHER COMPETING OR COMPLEMENTING, EITHER ALTERNATELY OR CONCURRENTLY -- FOR BRIEF, INTERMEDIATE, OR EXTENDED DURATIONS. (JH)

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STUDIES IN CINE-PSYCHOMETRY
I: Preliminary Factor Analysis of Visual Cognition and Memory

FINAL REPORT
July 1965

Prepared by
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Grant Number 7-12-0280-184
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I: PRELIMINARY FACTOR ANALYSIS OF VISUAL COGNITION AND MEMORY

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FOREWORD

When work began on the study to be reported here, there was a worrisome shortage of guidelines to direct the work. It was necessary to develop many experimental tests, predominantly on motion picture film, and few investigators had gone before to clear the way and identify the major dangers. There were questions concerning the range of exposure times which might be used, the physical conditions of testing rooms, the effects of repeatedly controlling examinee response time, the tolerance levels even of paid examinees, the reliability of test projection systems, and other problems too numerous to mention. Even now, few of these questions are disposed of, yet none seems to qualify as a barrier to continued and reasonably intelligent action.

Along the way, the bits of guidance and help needed for progress managed always to appear. Some of these, in approximately reverse order chronologically, were the responses of the examinees; they reacted in ways which were constantly reassuring. Also, the projection systems and the physical conditions of testing failed to produce any of the anticipated disasters. Films did not ignite in the projector, as some skeptics had predicted they would, nor did projection lamps expire in mid-item. With a few minor exceptions, each of the several critical testing sessions proceeded according to plan, thus contributing further demonstrations that such work was at least feasible. Probably the most critical help came, however, from those whose talents had encompassed the production of instructional films, not the development of psychological tests. They regularly understood item and test specifications which even the communicator could not adequately describe. They also understood other items and tests the communicator had not imagined; most of these are included in the experimental tests of the study. We are pleased to acknowledge this help. It was given by Karl B. Lohmann, Jr., Calvin S. Pryluck, Ellis L. Ralston, Vernon E. Putnam, and Maynard W. Kessler.

Until the very last, it was hoped that this report might include additional analyses of the present data. In particular, oblique rotations of all or most of the 30 obtained orthogonal factors were sought. Those and some related analyses are not complete, however, and must be reported later.

W. F. S. and R. E. S.

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INTRODUCTION

The capabilities of the motion picture are such that it can be seriously considered for use in psychological measurement. In fact, it seems surprising that few attempts have been made to study or to employ film in psychometric research. Human beings behave in contexts which are not static, not principally verbal, and not characterized by the presence of print. Conceivably, some of this behavior involves abilities or predispositions which are not amenable to adequate sampling and measurement with printed paper tests. Not all psychometric instruments are printed, yet it is the exceptional rather than the typical test which is not only printed, but necessarily static and predominantly verbal. Virtually all factor analytic research on the organization of intellect, and most work on personality, has relied solely on printed measures.

The general characteristics and potentials of film in testing have been summarized elsewhere, together with a brief historical overview of its use as a research tool (Seibert and Snow, 1965). Only a general orientation needs to be provided here.

Although cinematography and psychometry have been associated sporadically throughout the present century, most early studies used film only in its simplest and most conventional form as a recording of human behavior or as a convenient "container" for static information. The invention of group testing with motion pictures, in which film provided both unique medium and unique test form, did not occur until 1942. It is this event which seems to justify the term "cine-psychometry," implying more than merely "tests on film." The idea can be attributed to three individuals: J. J. Gibson, J. C. Flanagan, and F. A. Geldard.[1] Its development was part of the AAF Aviation Psychology Program and was concerned primarily with aptitudes involved in motion and distance perception and proficiency in various air crew performance tasks. Aside from subsequent research with several of the Air Force film tests (Roff, 1952; Fruchter and Mahan, 1952), film has been used sparingly in the measurement of social perception (Heider and Simmel, 1944), memory for witnessed events (Ray, 1947), some personality characteristics (Thurstone, 1953; McIntyre, 1954), proficiency in mechanical tasks (Carpenter, et al., 1954), and the performance of teachers in classroom situations (Schalock, Beaird, and Simmons, 1964). The purpose of the present research was to begin an analysis of film's contribution to the factor analytic study of human intellect.

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[1] Gibson, J. J. Personal communication, November 18, 1964.

COGNITIVE FACTOR THEORY

From Spearman's initial theory, through the work of Burt, Thurstone, Vernon, Guilford, and others, factor analytic investigation into the nature of human intellect has suggested several theoretical models of cognitive performance. One of the more generally accepted formulations consists of a hierarchy of mental factors, ascending from a specific-action level through minor group, major group, and general factor levels (Vernon, 1950). Another is a matrix model of primary traits organized into the three major dimensions of test content, mental operations involved, and form of product obtained (Guilford, 1959). These models represent logically and empirically systematized, descriptive theories of human abilities which are not incompatible, since Guilford's "Structure of Intellect" may be contained within one level of hierarchy and since the three dimensions of his matrix may themselves represent higher-order levels or factors. Continued factor-analytic research may thus produce a completed and coordinated model of intellectual organization, and as Guilford (1961) has suggested, may provide a basis for comprehensive cognitive theory in psychology. There are, however, several serious theoretical problems which such research must face. These involve 1) the number of abilities required to describe completely, at any given level, the dimensions of intellect, 2) the origin and course of development of these abilities, and, perhaps most basically, 3) their psychological meaning as factors.

The potential significance of cine-psychometry in the development of cognitive factor theory should be considered with respect to these problems.

The Universe of Abilities

Mental abilities are usually defined in terms of factors. Aside from the methodological idiosyncrasies which can, in diverse ways, produce "artifactors," there is some doubt that even properly executed, method-constant, factor analytic research can ever define a consistent, finite universe of mental abilities. In recent years, the number of identified factors has increased steadily. Guilford's system contains, by last count, 62 known factors and at least 58 hypothesized but as yet undemonstrated factors (Guilford and Hoepfner, 1963). There is in addition the distinct possibility that more than one ability could be obtained for many of the cells of Guilford's matrix, since parallel factors for auditory and visual modalities have already been identified in two cells. The spectre of 400 or 500 possible tests and 120 or more orthogonal dimensions is fed further by the argument that abilities have been inadequately sampled by arbitrary restriction to printed test content. For some, Guilford's model already lacks theoretical economy; to add to the present list of independent factors by introducing new test media appears only to compound the problem.

It *is* quite possible that innumerable new factors might be defined by employing the unique stimulus conditions provided by motion pictures. Thurstone (1948, p. 404) and Guilford (1959, p. 396) have both postulated specific abilities for which film testing would be appropriate, and possibly necessary. More generally, Gibson (1947, p. 20) has suggested that:

> "...the characteristics of motion pictures...namely motion, sequence, pacing, and realism...presumably have their psychological counterparts. Human behavior, and the capacities latent in it, also involves motion, order, tempo, and the experience of reality. It is reasonable to suppose, therefore, that the motion picture makes available to the test designer not only a special method of measuring known factors of human ability, but also gives him access to new and unnamed functions not accessible to conventional methods of test construction."

Knowledge about such functions can hardly be considered undesirable arbitrarily and might be of considerable theoretical utility. The inclusion of film tests in factor analyses of intellect might clarify present interpretations of some known factors. Furthermore, factors based on such tests may force modifications, extensions, or even simplifications of existing organizational models. The degree of control over within-item stimulus sequence and exposure time which film permits might also allow more adequate measurement of some kinds of cognitive performance. Alternatively, one major outcome of research in this direction might be the finding that print-based abilities can account for performance under more complex or dynamic stimulus conditions.

The Development of Abilities

Although any comprehensive cognitive factor theory must include a developmental component, factorists have, for the most part, concentrated on the structure of adolescent and adult abilities with little direct concern for origins. If the assumption of fixed intelligence and predetermined development is untenable, as Hunt (1961) has argued, then alternative conceptions of cognitive development are required and these must account for the multiplicity and organization of factors found with adults. The views of Piaget (see Flavell, 1963), Bruner (1964), and others depict intellectual growth as relatively homogeneous, emphasizing a series of transitions in cognitive processes which occur along a single, chronological continuum. This conception contrasts sharply with the heterogeneity and dimensional form of factor-based theory, yet there is a similar contrast within the history of factor analytic research itself. Spearman's (1927) general and specific factors were based largely on research with children. His interpretation stressed process characteristics of intelligence in terms of "mental energy" and "mental engines." Thurstone (Thurstone and Thurstone, 1942), on the other hand, tended toward the dimensional terminology of "faculties" and "functional unities" in discussing primary abilities found in high school and college students. Guilford's many dimensions have arisen predominantly from analyses using military personnel, although more recently his work has increasingly involved adolescent groups.

The apparent disparity between conceptions of childhood and adult intellect may be superficial. Using the differentiation and specialization hypotheses proposed by Garrett (1946) and Ferguson (1954, 1956) respectively, together with the recognition that factors probably represent theoretical abstractions rather than fundamental properties, it is possible to obtain at least outline coordination of these views. According to these hypotheses, abilities develop in children, differentiate and/or converge, and stabilize in adults as a function of intra- and inter-task transfer, and overlearning. The specific abilities that will emerge and become stabilized are prescribed by existing cultural needs for specialized skills (see also Vernon, 1965). An important connecting principle is thus provided, but will require extensive and rather specialized psychometric research to establish the connection. Some thorny questions are involved.

First, Ferguson's theory implies that the completion of a finite structure of intellect can never be fully accomplished because culture changes. The abilities extant in urban America, circa 1965, may well be different in important respects from those existing in 1945, or those to be identified in 1985. Modification of educational emphases might constitute one prime cause of basic cognitive changes. Another particularly salient social change over the past 20 years has been the increasing role of visual communication media in the lives, especially, of children. Today's college sophomores, and all ages beneath them, have lived daily with film and television virtually since birth. It is not unreasonable to expect that this experience affects perceptual and cognitive behavior and, further, that these effects might reasonably be assessed using cine-psychometric devices.

Second, the tracing of abilities back from adulthood, where they have been identified, to antecedents in childhood will require modification of most factor reference tests currently in use. By virtue of children's earlier sophistication with, or at least their active attention to, visual entertainment media, it is possible that specially constructed sound motion picture tests might permit measurement of some abilities, both verbal and nonverbal, at earlier ages.

Finally, and most importantly, the coordination of cognitive process theory with cognitive factor theory must necessarily involve the interpretation of abilities in terms of processes, rather than as dimensions; this may require no less than the unification of experimental and correlational psychology envisioned by Cronbach (1957). Hunt (1961) has argued effectively that the terminology of "dimension" and "scale," implying as it does a set of static "ruler-like" quantities, obscures developmental and dynamic characteristics of mental abilities. It will be suggested below that traditional forms of test construction and analysis similarly obscure the process characteristics of cognitive performance.

The Nature of Abilities

A consideration of the organization and development of abilities leads inevitably to questions concerning the psychological significance to be attached to factors. In a recent review of this longstanding controversy, Coan (1964) indicated that, as statistical entities, factors are operationally definable mathematical derivatives of covariation. They represent covariation among psychological variables in a manner similar to correlations and, subject to replicability, can be meaningfully interpreted just as correlations are interpreted. In this sense, factors can reflect a kind of psychological reality and thus offer one form of description for behavioral phenomena. Whether factors are conceived to represent classification principles, functional psychological unities, or even psychobiological structures, they are subject to the same interpretive restrictions usually imposed on correlational data. The choice of interpretation is probably best made in terms of its theoretical utility and the extent to which it leads to, or can be subjected to, further research. Thus, Coan argued, factors may be taken to identify mental abilities so long as the somewhat arbitrary, hypothetical nature of the ability construct is recognized. A charge of factor reification can be justified only when factors are regarded as the ultimate objectives of research, rather than as theoretical constructions, to be abandoned or replaced when their usefulness has been outlived. In Royce's (1963) view, factors are useful as theoretical constructs in that they provide a means of relating concepts within broader theoretical networks; they are "bridges" for the linking of "island universes" in the development of general psychological theory. However, just as factor analysis might in this way contribute to the experimental study of cognitive processes, so experimental analysis seems uniquely valuable for the further understanding of abilities. Cognitive factor theory is itself an "island universe" and the underlying nature of mental abilities, as factors, can best be determined only through theoretical and methodological triangulation with experimental psychology.

In the light of this argument, Guilford's (1961) discussion of factors as information-processing functions seems particularly important. By emphasizing processes, it enables a comparison of factorial approaches to understanding an area of behavior with interpretations obtained from traditional experimental analysis and, hence, contributes to the formation of Cronbach's unified discipline.

One contribution which cine-psychometry might make relates to this concern. Cronbach's comparison of correlational and experimental research strategies may be augmented by an additional distinction, elaborated by Ahmavaara (1957) and subsequently supported by Bargmann (1960), between *abstractive* and *mechanistic* theory. Differential psychologists have tended to leave implicit the fact that performance on a single test item involves psychological *processes*, occurring *within an interval of time*. Since only total testing time is controllable on group administered printed tests, item performances are treated as instantaneous responses, summable, as "bits of ability," to a total test score. Distributions of such scores demonstrate the fact of individual differences and provide scales of measurement for underlying, hypothetical traits. Intercorrelations among scales, appropriately manipulated, yield abstractive theories (i.e., factor solutions) which represent performance in terms of a configuration of dimensions. These formulations are valuable as descriptions of functional relationships existing within or among cognitive processes but they are *atemporal*. Since the temporal-sequential characteristics of item performance have not been preserved, or systematically manipulated, the abstractive theory cannot provide descriptions of functioning cognitive processes in mechanistic terms. Mechanistic theory, in contrast, pursues operational rather than dimensional descriptions, often involving graphic representation of "inner mechanisms" as working models, and includes as a central concern hypotheses regarding the temporal-sequential nature of the process's functioning components. It is primarily mechanistic description which the experimentalist seeks. All neo-associationistic and experimentally-based cognitive theories are mechanistic in this sense, although current work on short-term memory (e.g., Broadbent, 1958) and in computer simulation (e.g., Newell and Simon, 1961) best typify the use of working models. Mechanistic description is no less a theoretical abstraction than abstractive, dimensional description, but it has so far seemed more useful to psychology.

Guilford's matrix model and his interpretation of factors in informational terms represent an advance toward conformation of cognitive factor theory with general cognitive theory but such efforts seem hampered by abstractive reliance on the concept of instant, fixed dimensions and categories of such dimensions. In a figurative sense, what is proposed here is a return to Spearman's "mental engines." Spearman described his general factor as a kind of mental energy which operated through many specific engines. The present discussion merely reemphasizes the interpretation of factors as engines, seeking mechanistic description of the process characteristics of cognitive abilities, and replaces the concept of energy with the concept of information. Such a reorientation profits from some parallels with the work of Cattell (1957) in personality factor theory. The Guilford matrix might be conceived as a dynamic lattice, comparable to Cattell's hydraulic model, in which information flows through, and is acted upon by, series of nodes (factors) arranged in a multidimensional network.

The temporal-sequential and dynamic characteristics of film may permit both a closer examination of the information processing aspects of item and test performance and the administration of experimental conditions to large groups. Fleishman (1962) has already demonstrated how stages of practice on an apparatus learning task can be used to advantage as independent variables in factor analyses. The use of film seems to extend these possibilities through controlled manipulation of stimulus variables within and between items or test parts. In addition, other variables under the control of the factor analyst, such as test instructions and administration order over replications, should also be candidates for experimental manipulation.

In short, the work reported here is based on the view that 1) since abilities are demonstrated in settings which are not all static, verbal, or dominated by print, unique characteristics of motion pictures may permit the isolation of abilities not measurable by printed tests, and 2) the controls provided by film, particularly of temporal-sequential variables, may permit the coordination of experimental and correlational analysis of mental functioning and the interpretation of such functioning in terms of its information-processing characteristics.

PROBLEM

To serve as an initial study in cine-psychometry, the present investigation was planned as an exploratory factor analysis of intellectual abilities, the major referent for which would be Guilford's Structure of Intellect. Guilford's model provides both a summary of past research and, by its many empty cells, a rich source of hypotheses for further work. A consideration of abilities relevant to tasks involving motion, sequence, or real human behavior adds even further to the list of hypothesized factors arising both from occupied and presently unoccupied cells in the matrix.

Domain Definition

Of primary concern here are the operations of cognition and memory, which form only two of the five operation columns of the structure. The domain under examination has been further restricted, with some few exceptions, to visually communicated figural content. All levels of Guilford's product dimension for which reference factors are available have been included.

Aside from the obvious need for some practical limits, there are substantive reasons for these particular choices. First, visual cognition and memory represent areas where the contributions of film may be expected to be both greater and more readily studied. In its use here, the motion picture can be considered an expository device, with the role of the viewer being one of relatively passive information reception. While adherence to this view as a theory of cinema is unwarranted, it does seem likely that many unique film variables should most strongly affect, and thus be most useful in studying, information reception and storage processes. Furthermore, strategies used in measuring productive thinking abilities and most evaluative factors must frequently be more complex and this complexity is magnified in film test production. By contrast, cognition and memory abilities seem simpler psychometrically and, in a sense, more basic psychologically. They seem more susceptible to translation into terms comparable to the bulk of experimental theory and research on perception, learning, and memory. Second, while cognitive abilities have been investigated fairly thoroughly by factor analysts, the memory column has received relatively little attention. The two domains have not been explicitly studied together, though they should be closely related. Third, motion pictures seem to require sequential, or accumulative, cognition in interaction with memory processes. Considering such ability tasks in informational terms, it seems likely that a discrete dichotomy between visual cognition and visual memory abilities, while sometimes helpful, is nonetheless a convenient fiction. There should be an underlying time continuum along which the various phenomena of sensation, perception, cognition, and memory may be arrayed. Because visual input must travel this temporal path and because such input is a complex stream of information, one might expect to find a sequence of interdependent factors which represent individual differences in reception, organization, identification, storage, and retrieval operations. Finally, at least for cognition and memory, analysis of Guilford's product dimension suggests a hierarchy of interrelated and prerequisite levels of product. The production of classes must depend in part on operations with units. Relations must be connections between units and/or classes of units, and systems must also depend on some or all of their subordinate products. Similarly, transformations and implications suggest operations on information which must already have existed in lower forms at some point in the process. Thus, just as temporally interrelated factors may be expected in the cognition-memory domain, so too might factors which reflect a hierarchy of operations on increasingly complex products. Film seems most relevant for figural and possibly behavioral content where, in turn, the informational continuities suggested above should be most evident.

The purpose of this investigation was 1) to begin the exploration of individual differences in performance on tasks characterized by moving, sequential, and/or behavioral content and, 2) to examine empirically a conception of abilities as information processing operations. The core reference for the study was defined as the visual, figural, cognition-memory portion of Guilford's model but it was hoped that base-line data could be obtained which would suggest possibilities for similar studies throughout the Structure of Intellect matrix.

Hypotheses

Eight new factors were specifically hypothesized. Also, the study sought to confirm the existence of seven factors isolated and identified in only one or two previous studies and to gather and examine data pertaining to four more general hypotheses which relate to the information processing nature of intellectual organization. These hypotheses are discussed under three major headings.

Visual Memory. The factors now known to exist in the visual memory domain are largely the contributions of Kelley (1954) and Christal (1958). The present investigation relates most closely to the work of Christal, whose work includes the isolation of three new factors; memory for color, memory for position in space, and memory for position in temporal succession. He failed to find factors representing incidental memory, delayed recall, or memory for specific kinds of content, other than the color factor. Further, he had hypothesized that visual imagery might exist as a second-order combination of memory for form, color, and spatial position. Since no form memory ability was obtained, the imagery factor was not pursued. Kelley found, however, a visual memory factor which Guilford (1959) classed in his figural-unit-memory cell. It is suggested here that Kelley's visual memory factor is equivalent to memory for form. More importantly, visual imagery seems not to be so simple and not necessarily so inflexible. It might more clearly be viewed as an information processing strategy for memory storage which is alternative to a verbalization process and which should be conceived as an "inner video tape recorder" rather than as an "inner photographic plate." Eidetic imagery is known to decline in children during early or pre-adolescence (Allport, 1924; Kluver, 1932), where Piaget's formal operations in thinking begin to appear (Hunt, 1961). This is also the stage at which verbal skill seems sufficiently developed to predominate as an abstracting and labelling strategy for the storage of ever-growing bodies of increasingly verbal information. Verbal memory would become the more efficient encoding strategy but necessarily a selective one. The more primitive imagery process could still be useful, however, when relevant information 1) could not be selected for storage from a complex, possibly dynamic, context, 2) was essentially nonverbal, as in artistic appreciation, or 3) was available only briefly, as in tachistoscopic presentation. It can be supposed that many visual memory abilities are adult specializations of childhood eidetic imagery. Anecdotal reports suggest that some individuals can relate the story content of a movie by verbalizing from an internal visual "playback" of the film, while others rely on information stored originally as verbalizations. Student preferences for geometric vs. algebraic explication of factor analytic concepts are similarly suggestive and Meier (1939) has found that visual memory abilities are especially well developed in artists. While images could also consist of letters or words, the figural, rather than the symbolic, characteristics of such stimuli would be crucial. The work of Averbach and Coriell (1961) on short-term visual memory involves the processing of sensory images of alphabetic arrays. It is reasoned, then, that visual imagery should be a higher-order factor involving all memory tasks for which imagery rather than verbal labelling is the superior form of information storage. It might include Christal's color, spatial order, and temporal order memory, Kelley's visual memory, and even some cognition factors. Perceptual foresight, which Guilford (1959) classified as cognition of figural implications, and a similar factor, called "spatial scanning" by French, Ekstrom, and Price (1963), would seem to require rapid, successive iterations of forming and following images of spatial paths.

Reference tests for these factors have been included in the present analysis. While Kelley's tests were not obtained for this study, several printed and motion picture tests were designed specifically as measures of figural memory. In addition, a new factor referred to as behavioral memory was hypothesized. It was represented by seven tests involving recall or recognition of live and animated motion picture action.

As treated by Christal, incidental memory would involve recall of information which Ss had seen but had not intended (i.e., been instructed) to remember. Since no such factor appeared, the conclusion was drawn that incidental and intentional memory required the same ability. Incidental memory might be considered a part of, and subordinate to, the visual imagery strategy discussed above. That is, information remembered incidentally, even if verbal in nature, is remembered by imagery, while intentionally learned material may be stored as images or encoded for memory by verbalization whichever seems appropriate at storage time (see Deese, 1964). Thus, tests devised to measure incidental memory, while not forming their own factor, should be distributed among intentional memory factors involving visual imagery but should not load on factors in which verbal memory processes play a significant role. None of Christal's six incidental memory tests had loadings on his verbal comprehension factor and only one demonstrated any appreciable loading on an associative memory factor which was largely verbal in nature. Five of these tests were incorporated into the present analysis. Also, two film tests representing behavioral memory were designed to help clarify the postulated imagery vs. verbal coding distinction relative to incidental memory. Each film was presented with the simple instruction: "Watch this film. You will be asked questions about it later." The pair was assigned to adjacent positions in the battery for administration. It was hoped that memory for the content of the first film in the pair would be incidental (i.e., unselective), while that for the second would be intentional (i.e., selective), due to increased familiarity with the task.

It should be noted that in previous work three of the five Christal tests mentioned above,also represented the factor of memory for position in temporal order. The temporal order dimension may thus, in part, be incidental memory. Also, three of these five tests were originally constructed as measures of delayed recall. As confirmation of Christal's work, neither incidental nor delayed recall was expected to emerge as a separate factor in this analysis. But the delay period used in one test, sequence memory, was changed from its original three day interval. In the present study, the test items involved a delay of one or five days, so there was some opportunity for longer-term effects to appear.

Serial cognition. A rather complex perceptual process is hypothesized to underly abilities usually placed in the cognition and memory domains. It seems that it should consist of several separable operations whose general function is to organize and register incoming visual information before further operations are applied. The visual input information has a temporal-sequential aspect arising either from eye movements over a static stimulus field or because moving stimuli and sequentially presented static stimuli necessarily involve expenditure of time. Thus, several of these processing operations must be characteristically serial. At least four postulated factors would be involved. First, the traditional memory span factor, observed by Kelley (1954) and others, would relate to the sequential "length" of the input message. Then, in addition to serial memory span, an instantaneous memory span is postulated which would relate to message "breadth," i.e., the amount of information to be recorded simultaneously. The two stage memory systems suggested for vision, by Averbach and Coriell (1961), and for audition, by Broadbent (1958), may reflect the two factor notion to be examined here. Third, a factor to be called serial integration should represent the gestaltic organization of spatially and temporally separated percepts into unit cognitions. This factor should be related primarily to instantaneous memory span, since integration would presumably occur in a short-term or temporary memory storage, and secondarily to serial memory span, depending on the extent of temporal spacing involved. Fourth, a serial accumulation factor should exist and be related primarily to serial memory span. The film test factor reported by Roff (1952) as sequential perception is expected here. Two of the Air Force films representing this factor involve sequential exposure of parts of geometric figures. Fruchter and Mahan (1952), in replicating this factor, called it simply "pattern perception," because the items of a third test contained no filmic stimulus sequence; this third test presents full-screen airplane formations tachistoscopically, with these to be remembered and their pattern reproduced. It is likely, however, that the plane formation test is a serial task but that the temporal sequence is examinee-based (i.e., stems from eye movements).

The above integration and accumulation processes are presumed to form the base of an operation product hierarchy, consisting of three separate columns of abilities. One of these is Guilford's figural cognition column and another is, in this study, a combination of Guilford's memory columns. A third column is suggested to lie between cognition and memory, representing cognitive accumulations for memory storage or, alternatively, short-term memory functions involved in obtaining cognitive products. While it should consist of abilities comparable to all cognition and memory product levels, only four such levels are expected. The traditional perceptual speed factor, which Guilford places as figural identification, is hypothesized to be serial comparison at the unit product level. The new factors of serial relations, serial orientation, and serial visualization, appropriate for the relations, systems, and transformations levels, respectively, are also postulated. Serial relations would require seeing relationships as these evolve across systematic changes in figures, then selecting or extrapolating some terminal form in the series. It might also play a role in drawing relationships, in hindsight, from unselectively stored memory images. Serial orientation can be imagined as obtaining some conception of a fixed figural system from observing the system in dynamic transition, while serial visualization refers to building an image-description of the transition or transformation applied to the system.

Operation hierarchies. Most generally stated, the hierarchy hypothesis suggests that, for any given ability, there are sets of subordinate abilities representing operations prerequisite to producing that performance. If the figural cognition column of the Structure of Intellect is such a hierarchy, then variance arising from operations on units should be present, in decreasing proportion, in abilities at each successive level above the units cell. Variance from other product levels would similarly be involved in abilities standing higher in the hierarchy. A single group factor, oriented in parallel to the column, could be obtained on which tests at each level would load in a systematically increasing or decreasing fashion. If separate oblique factors were obtained for the six abilities, then the matrix of intercorrelations among factors should form a simplex and a second-order factor would again show increasing or decreasing loadings for the first-order factors.

Similar hierarchies of subordinate ability sets might presumably be obtained up any column or across any row of that portion of the Structure of Intellect under examination. Figure 1 summarizes all of the hypothesized and reference factors used in the present study and provides a schematic diagram of the proposed hierarchical organization. The solid-walled cells represent components of the hierarchy. Broken-walled cells designate factors whose position in the hierarchy has been only roughly approximated or reference factors for which only one representative test appears in the present battery. Information is conceived

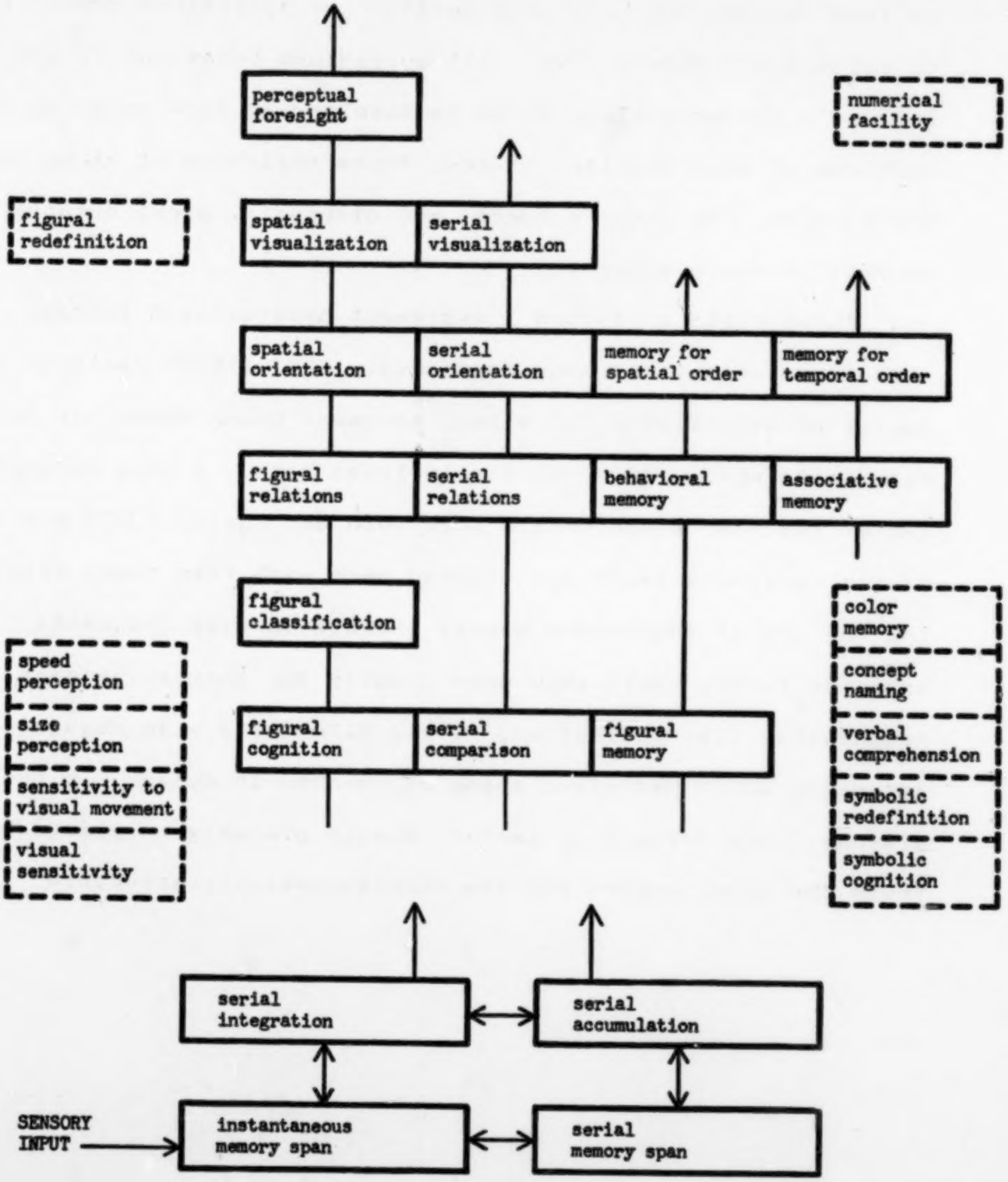
perceptual foresight
numerical facility
figural redefinition
spatial visualization
serial visualization
spatial orientation
serial orientation
memory for spatial order
memory for temporal order
figural relations
serial relations
behavioral memory
associative memory
figural classification
color memory
concept naming
speed perception
size perception
sensitivity to visual movement
visual sensitivity
figural cognition
serial comparison
figural memory
verbal comprehension
symbolic redefinition
symbolic cognition
serial integration
serial accumulation
SENSORY INPUT
instantaneous memory span
serial memory span

Figure 1. Hypothetical operation hierarchy including all hypothesized and reference factors represented in the battery.

to flow through the base configuration of operations shown, then up columns and across rows. All operations below and to the left of a chosen ability would be involved at some point in the exercise of that ability. Hence, three varieties of higher-order factors, for rows, columns, and diagonals, might demonstrate aspects of the hierarchy.

Three cells of Figure 1 represent hypothesized factors which have so far not been mentioned. Roff (1952) isolated the factor of sensitivity for visual movement using three Air Force film tests which, in turn, are included here. A size perception factor has been found before (Guilford and Lacey, 1947) and one of its reference tests was coupled here with film tests requiring the use of short-term memory storage in size judgments. The expected factor would show more clearly the imagery process in comparative size estimation. Three film tests also required judgments about perceived speed or changes in speed. In the hierarchy, such perceptual factors should probably be placed between the basal system and the cognition-memory structure.

DESCRIPTION OF TESTS

In this section, each test in the battery administered during the present study is described. Since the experimental film tests involve a non-print medium, such description is necessarily incomplete and risks some misrepresentation.[2] Nevertheless, at least a general familiarity with the test titles, styles, and contents is required for understanding the later discussion of results.

General Characteristics of Film Tests

A film test may take two general forms. It may on the one hand present some continuous body of information, such as a short story, then be followed by printed questions which relate to the film content. On the other hand, it may be "itemized" so that a short filmed sequence, for item n, is followed by presentation of alternatives on film and/or by a response time interval, then by the presentation of the next sequence, representing item n + 1. For the purposes of test description, the first of these general forms is designated as a unitized film test (UFT), while the latter is an itemized film test (IFT). A combination of these forms is also possible and can be identified as UIFT.

Four cinematographic techniques may also be distinguished for use in test description: Live Action (LA), in which real events and environments are recorded on film; Simulated Live Action (SL), in which working models, mockups, etc. are used to represent and give the illusion of live action events; Animation (AN), where single frames of objects or of drawings are shot as still photographs but their synthesis on the screen gives the illusion of smooth motion or mobility; Serial Still (SS) presentations which, while photographed in a manner similar to AN, maintain a discrete, list-like structure on the screen.

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[2] Plans exist for publishing a filmed appendix which will include instructions and sample items from each experimental test used in this study. When funds are secured, the appendix will be completed and made available.

Experimental Film Tests

1. Successive Perception I (Gibson, 1947; IFT-AN)[3] Geometric figure drawings appear behind a moving, slotted overlay mat. For each item, S must determine the shape of the figure by viewing its successive portions as revealed through the downward moving slot, then recognize the correct figure from among five alternatives presented immediately thereafter in their entirety. The slot moves over the stimulus figure once at a constant speed.

2. Successive Perception IIA (Gibson, 1947; IFT-AN) A dot moves on the screen at constant speed and in a definite pattern, leaving no visible trace of its path. For each item, S's task is to visualize the pattern traced by the moving dot, then select the correct pattern from five alternatives presented

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[3] Numbers before each test title are the identification numbers used in all following tables and in the factor descriptions. No number is assigned to tests which were administered but not intended for inclusion in the analysis. In parentheses after each test title, reference citations and film test format codes are presented, where appropriate.

afterward. Part A employs straight line patterns having only right angles or diagonals.

3. Successive Perception II-B (Gibson, 1947; IFT-AN) This is Part B of test 2, above. It differs from Part A in that the paths presented consist of curves and loops of various sizes.

4. Successive Perception II-C (Gibson, 1947; IFT-AN) This is Part C of the above test. The paths used here resemble kymograph records.

5. Flying Orientation (Gibson, 1947; IFT-SL) In this test, the passing terrain seen from the open bomb-bay of an airplane is simulated. The S's task is to maintain orientation relative to a starting point as the plane goes through a series of 90 degree turns. Afterwards, S must indicate the direction of the starting point. A lettered, eight point compass is projected on the screen for use in selection of a response.

6. Estimation of Velocity (Gibson, 1947; IFT-SL) In each item, a plane silhouette moves across the screen at constant speed, then disappears behind a simulated cloud. After a variable delay, a flash in the cloud represents the explosion of an anti-aircraft shell. S's task is to decide whether the burst hit the plane or whether it occurred ahead of or behind the plane's judged position.

7. Landing Judgment (Gibson, 1947; IFT-SL) The projected picture for each item simulates the forward view from a plane's windshield during an approach to a runway. On the runway are five spots, marked A through E. S's task is to judge the letter on which the plane will first touch down.

8. Minimal Movement (Gibson, 1947; IFT-AN) A dot

appears in one quadrant of a cross-haired bombsight. For each item, S must determine whether the dot moves during its time on the screen and, if so, whether it moves upward, downward, to the right, or to the left.

9. Drift Direction (Gibson, 1947; IFT-AN) This test is similar to test 8, except that in each item, the dot moves. The task is to determine whether the dot drifts away from a path parallel to a crosshair and, if so, the direction of drift.

10. Rotation I (IFT-AN) Geometric figures rotate rapidly in a clockwise direction on the screen. After brief exposure, the figure disappears and four alternative static figures appear, labelled A through D. S must recognize the figure seen in rotation from among the alternatives presented.

11. Rotation II (IFT-AN) This test is similar to test 10, except that two figures appear simultaneously, rotating in opposite directions and superimposed. Rotation rate is also slower than in test 10. The task requires identification of both figures from four static alternatives presented afterwards.

12. Sequential Words (IFT-SS) Each item presents a six-letter adjective, one letter after another. Letters appear in a fixation box at screen center. The letters of each word are thus temporally spaced, but no spatially separated. Each letter appears on the screen for 31 msecs., separated by 62 msecs. of blank screen.

13. Successive Comparison (IFT-SS) In each item, a sequence of five figures is shown, with each figure appearing for two secs. Two figures in the sequence are identical. S must later indicate which figure was the one repeated. For purposes of

this identification, all are shown simultaneously on the screen.

14. Shapes (IFT-SS) Rectangles of varying shape but constant area are flashed on the screen. For each item, S must match the tachistoscopically presented figure with one of four subsequently presented alternatives.

15. Shape Changes (IFT-AN) This test is similar to test 14, except that smoothly expanding or contracting rectangles are presented, with one frame in the continuing change being marked with a centered "X." The shape of the rectangle at "X" time must then be chosen from four static alternatives. Tests 14 and 15 use an identical set of "correct" rectangles, but use differently randomized item orders and letter alternatives.

16. Picture Identification (IFT-SS) Each item presents a still photograph of some common object which is partially obscured by overlay strip mats. The task is like that of the Street Gestalt Completion Test (Guilford, 1959), except that exposure time is controlled (20 secs/item) and half-tone photographs are used instead of drawn silhouettes.

17. Successive Perception III (IFT-SS) As in test 16, each item presents a still photograph of some common object which S must identify by writing its name. Here, different portions of the photo are obscured by a series of eight overlay mats. Each mat represents a 16 x 16 grid from which 32 cells have been randomly identified and removed. With a mat change every 42 msecs., S never sees the complete photograph, but over one second (three complete mat change cycles), all details of the photo appear three times.

18. Successive Perception IV (IFT-SS) This test is

similar to test 17, except that the mat changes occur every 625 msecs. The visual effect is distinct from that of test 17. Here, the parts of the photo revealed through the mat openings appear to "dance" on the screen. S must identify the common object by writing its name.

19. Hidden Figures (IFT-AN) Four complex Gottschaldt figures are shown slowly revolving, one in each quadrant of the screen, labelled A through D. Centered on the screen, a simple figure appears which can be found "hidden" within one of the revolving complex figures. S locates the hidden figure and indicates his choice.

20. Evolving Figures (IFT-SS) Each item presents either four or five steps in a systematically changing geometric figure. After this sequence, either one or two further steps are represented by blank screen segments. The task is to determine the nature of the systematic changes, extrapolate over the blank step(s), then select from four alternatives the figure which correctly portrays the state of the changing figure at the time the alternatives appear on the screen.

21. Figure Detail Memory (IFT-SS) A complex geometric figure is presented tachistoscopically in each item. S must recognize and select the stimulus figure from among four similar figures appearing on the screen 427 msecs. after the stimulus figure disappears.

22. Random Shape Memory (UIFT-SS) A collection of 16 random shapes are projected in sequence. Ss are instructed to memorize the shapes and are required to recognize each of these 16 shape

from a subsequent set of 32 sequentially presented shapes. Order of presentation in each list is randomized.

23. Speed Changes (IFT-AN) In each item, a dot moves rapidly from left to right across the screen, passing through four vertical "gates," labelled A through D. The task is to determine the gate at which the dot increases or decreases its speed.

24. Speed Estimation (IFT-LA) Each item presents a view of the road and passing countryside as seen from the front, side, or rear window of a moving automobile. For each item, S judges the speed of "his" auto in miles per hour. Speeds ranging from about 15 to about 70 m.p.h. were used in filming. Item order is randomized.

25. Motion-Time Translation (IFT-AN) A ruler with units designated "0" to "10" moves right and/or left across a vertical marker at screen center. The task is to translate the sequence of movements of the ruler into a motion-time graph such that the ordinate of the graph represents ruler units, the abcissa represents time, and the graphed curve represents the series of ruler units marked during the sequence of moves. S must choose the correct graph from four alternatives presented after the ruler and marker have disappeared.

26. Social Abstracts IA (UFT-AN) The film depicts the silent actions of five "actors" in a simple social encounter. The actors, represented on the screen by different geometric figures, and the plot are adapted from a similar film constructed and used in studies of social perception by Heider and Simmel (1944). Following the film presentation, Ss complete a printed

test consisting of two parts. Variable 26. is Part A of this test, containing questions which require the recall and identification of characters and props and the order in which the actors entered and left the screen.

27. Social Abstracts IB (UFT-AN) This is Part B of test 26, above. It consists of true-false questions about the film's "human" actions and interactions.

28. Social Abstracts IIA (UFT-AN) A second film, constructed similarly to Social Abstracts I, involves eight different characters and a different plot; it is followed by a printed test similar in item composition to that for tests 26 and 27.

29. Social Abstracts IIB (UFT-AN) This test bears a relationship to test 28 which test 27 bears to test 26.

30. Story Frames (IFT-LA) Each item presents a 30 sec. live action sequence followed by a collection of four still photographs. S decides which, if any, of the four still shots are single frames extracted from the sequence shown previously. Each item is equivalent to four independent true-false questions presented simultaneously.

31. Story Sequences (IFT-LA) Each item presents a 30 sec. live action sequence, then five 5 sec. live segments in succession. S decides, for each segment, whether it appeared in the longer sequence.

32. Film Memory I (UFT-LA) After viewing a short motion picture filmed at a super market check-out counter, Ss are asked to list as many as possible of the objects appearing in the film. Any descriptive statement which distinguishes the object is judged as correct. Total correct identifications yields the

test score.

33. Film Memory II (UFT-LA) After viewing a short motion picture filmed in the parking area of a suburban shopping center, Ss are required to describe in writing the individuals appearing in the film. Again, any descriptive remarks which will serve to distinguish the individual are judged correct; the number of correctly identified individuals yields the score. Since this test was administered immediately after test 32, it was expected that Ss would predict the nature of the task during film viewing, although they could not predict well on the previous test.

34. Film Memory III (UFT-LA) This film depicts a sidewalk encounter between two college age people (actor and actress). A printed test follows in which true-false questions require recall of the series of actions and interactions portrayed in the film.

35. Abstract Reasoning (IFT-SS) Items in this test were patterned after those in the Differential Aptitudes Test of the same name. Each presents a sequence of four figures, followed by four labelled alternative figures. S chooses the alternative which he believes would logically follow next in the sequence.

39. Attention Span I (IFT-SS) Eight letter arrays are presented tachistoscopically, with S required to reproduce letters from the array, in correct spatial arrangement, immediately afterward. Each array consists of two horizontal rows and four letters per row. The arrays were constructed by random selection of letters.

40. Attention Span II (IFT-SS) Arrays similar to those

used in test 39 are presented tachistoscopically. S must reproduce, in correct spatial arrangement, vowels which appear in each array.

41. Attention Span III (IFT-SS) Again, arrays similar to those described above are presented tachistoscopically. Here, two arrays are presented, with 250 msecs. to 1 sec. intervening. S must determine the letter(s) (up to 3), if any, which appear in both arrays.

42. Short Term Visual Memory IA, IIA, and IIIA (IFT-SS) The items of each test in the short term memory series present eight-letter arrays tachistoscopically with varying time delay between the array and the appearance of a marker designating one letter in the array. The array and marker each appear for 31 msecs., the interval between ranging from 10 msecs. to 510 msecs. S must remember the entire array until the marker appears. He then records only the marked letter. For each item, letters and their positions were determined randomly. The marked letter positions were balanced for each fourth (i.e., 16 items) of each test. In all, three tests were constructed, with each consisting of 64 items, eight for each of eight delay intervals. Short Term Visual Memory I used a small bar marker which appeared just above or below a letter position in the array, Short Term Visual Memory II used a circle marker surrounding the letter position, and Short Term Visual Memory III presented a bar marker simultaneously with the array and a circle marker at variable delay intervals. These stimulus conditions and the method of partial report are closely related to those used by Averbach and Coriell (1961). It was hoped that these tests would permit a large

sample replication of the earlier findings as well as correlational analysis of short-term storage processes. Separate analyses were planned for STVM I, II, and III. Variables numbered 42 through 49 refer to the eight delay conditions, A through H, for each of the three tests. Parts IA, IIA, and IIIA represent the condition in which the variable marker preceded the array by 52 msecs.

43. Short Term Visual Memory IB, IIB, and IIIB (IFT-SS) Marker delay = 10 msecs.

44. Short Term Visual Memory IC, IIC, and IIIC (IFT-SS) Marker delay = 94 msecs.

45. Short Term Visual Memory ID, IID, and IIID (IFT-SS) Marker delay = 177 msecs.

46. Short Term Visual Memory IE, IIE, and IIIE (IFT-SS) Marker delay = 260 msecs.

47. Short Term Visual Memory IF, IIF, and IIIF (IFT-SS) Marker delay = 344 msecs.

48. Short Term Visual Memory IG, IIG, and IIIG (IFT-SS) Marker delay = 428 msecs.

49. Short Term Visual Memory IH, IIH, and IIIH (IFT-SS) Marker delay = 510 msecs.

50. Plane Formation I (Gibson, 1947; IFT-SS) This test presents a 5 x 5 cell grid in which five airplane silhouettes are arranged in some formation. S's task is to reproduce the formation on a similarly gridded answer sheet. Each exposure remains on the screen for two seconds.

51. Plane Formation II (Gibson, 1947; IFT-SS) This test is the second part of test 50. It differs from test 50 only in

that the exposure time used is 1.5 seconds.

52. Plane Formation III (Gibson, 1947; IFT-SS) This is a third part of the above test in which the exposure time is one second.

Experimental Print Tests

36. Sequence Memory. This test is an adaptation of one originally developed by Christal (1958). Each item presents a pair of titles of tests included elsewhere in the battery. S's task is to indicate which member of the pair appeared first in the battery. It is listed here as an experimental test since the memory required ranged over a one or five day period, rather than the three day span used in Christal's study. Also, no test descriptions accompanied the test titles in this administration.

37. Pattern Association. This is an adaptation of a test originally developed by Christal (1958) and entitled Pattern-Word Association. It requires Ss to memorize a list of paired geometric figures and later to indicate the correct associations by matching.

38. Color Form Recognition. This is also an adaptation of a test by Christal, entitled Color Form-Word Association. It presents a list of colored geometric forms for memorization. Afterward, S is given a larger list of colored forms from which he must recognize and select those presented previously.

Reference Tests and Factors

In the interests of space, the reference tests used will not be described in detail. Rather, a simple listing of test titles, identification code numbers used in the present study, and factors with which the tests have previously been associated is provided in Table 1. Detailed descriptions of these tests are available in Guilford (1959), Christal (1958), and French, Ekstrom, and Price (1963).

Marker Variables

92. Near Point Visual Acuity. All Ss were tested individually on the Bausch and Lomb Orthorater. They were requested to wear spectacles during the examination if they wore them during group testing sessions. Only binocular vision was tested. Variable 92 is the Orthorater near-point visual acuity score.

93. Color Sensitivity. The Orthorater color sensitivity score, using adapted Ishihara plates.

94. Far Point Visual Acuity. The Orthorater Far-point visual acuity score.

95. Viewing Distance. For the group testing sessions, each S was assigned randomly to a seat in the administration room and was required to occupy the assigned seat throughout the testing sessions. Viewing distance was indexed as the distance in feet between the center of the screen and the back center of each seat.

96. Viewing Angle. The angle, in degrees, between a perpendicular to screen center and the line of sight from each seat was assigned as a personal variable.

Test Construction

The production of a motion picture test involves procedures which deviate somewhat from those typically followed in printed test development. Briefly, the stages of production were the

Table 1

Reference Tests and Factors

Reference Factors	Variables	Reference Tests
Memory Span	53	Auditory Memory Span
	54	Auditory Letter Span
	55	Visual Number Span
Associative Memory	56	Number-Word Association
	74	Picture-Number
Memory for Spatial Position	57	Position Recall I
	59	Space Memory
	88	Position Memory
Memory for Temporal Order	58	Position Recall II
	60	Position in Succession
Memory for Color		Color Discrimination
	61	Color Recall
	86	Color Memory
(Factor(s) unknown)	89	Pattern Detail Memory
Numerical Facility	75	Addition
Verbal Comprehension	82	Wide Range Vocabulary
Symbolic Cognition	84	Disemvoweled Words
	87	Word Combination
Figural Cognition (Speed of Closure)	63	Closure Speed
	72	Concealed Words
Figural Classification	65	Figure Classification
	68	Picture Classification
Figural Reasoning	66	Figure Matrix
	85	Figure Analogies
Spatial Orientation	77	Card Rotation
	78	Cube Comparison
Spatial Visualization	90	Surface Development
	91	Paper Folding
Perceptual Foresight (Spatial Scanning)	79	Maze Tracing Speed
	80	Choosing a Path
	81	Map Planning

Table 1 (continued)

Reference Factors	Variables	Reference Tests
Figural and Symbolic (Identification Perceptual Speed)	69	Identical Pictures
	76	Number Comparison
Concept Naming	62	Picture Group Naming
Figural Redefinition (Flexibility of Closure)	67	Closure Flexibility
	70	Hidden Patterns
	71	Copying
Symbolic Redefinition	64	Word Transformation
	83	Camouflaged Words
Length (Size) Estimation	73	Estimation of Length

following: 1) During and after a relatively unrestricted hypothesis generation phase, test ideas were sketched verbally and in sequences of rough drawings. 2) Extensive discussion between psychologist and film production specialist then led to the execution of one or two trial items on film. 3) Trial items frequently went through several film iterations before the result seemed satisfactory. Then, all items were specified, prepared as photographic quality visual materials, placed in order, and committed to film. Where live action film was required, instead of a still sequence or animation, extensive shooting was accomplished before the items were specified. Items were then edited from existing film footage, ordered, and spliced. 4) After the visual portion of the instructions and sample items were prepared and spliced into the test, a final screening and editing was completed. In the interest of economy, most tests were left as original film for administration. Prints were made only when a test was deemed too costly to reconstruct if damaged or when it was necessary to include auditory instructions on the film. For most tests, instructions were read aloud, in company with filmed example items, at administration time. This proved satisfactory. 5) For a number of tests, trial administration to a small group of Ss was necessary to check the adequacy of instructions and test difficulty.

Subjects

Ss for the study were recruited from the ranks of those enrolled in Freshman Engineering at Purdue University. All were male, first-semester freshman. In return for full participation, amounting to approximately 21 hours in test sessions, Ss received $28.00. Financial considerations necessitated planning for about 100 Ss, even though a much larger number would have been desirable. Initially, 118 Ss responded to the invitation to participate. After three testing sessions, N had dropped to 109, of which 100 eventually completed all sessions satisfactorily and provided the data for the study.

Administration and Score Processing

Seven testing sessions were scheduled for 7:00 p.m. to 10:00 p.m., with a 10 to 15 minute rest period midway in each session. Testing took place on week nights over a one month period in Nov.-Dec., 1963. At each session, the tests administered included roughly equal numbers of filmed and printed tests.

All group testing was executed in a slant floor lecture hall with a seating capacity of 478. This room provided excellent facilities for audio-visual presentations, including an enclosed projection booth, a 13' x 30' beaded projection screen, an audio amplification system with ceiling speakers, and continuously adjustable illumination. During administration of film and slide tests, illumination was set to provide approximately .4 to .9 foot-candles at each seat-arm writing surface. A Kodak Pageant 1200 watt 16 mm. sound film projector, an Anscomatic 35 mm. slide projector, and a Wollensak 1500 audio tape recorder were used for test presentation.

Many tests were hand-scored, although IBM answer sheets and machine scoring were used where possible. Together with a complete listing of all tests, Table 2 includes information on administration order, distribution statistics, and reliability.

Table 2

Summary of Descriptive and Identifying Information for All Variables

Variable No.	Name	Admin. Order[a]	Approx. Testing Time	No. of Items	Mean	Sigma	Reliability[b]
1	Successive Perception I	A2	14 All parts administered during 24 mins.	35	21.79	4.56	.67
2	Successive Perception IIA	A2		20	11.72	3.44	.64
3	Successive Perception IIB	A2		15	7.10	2.24	.33
4	Successive Perception IIC	A2		15	6.65	2.34	.41
5	Flying Orientation	B2	18	25	8.05	6.50	.72*
6	Estimation of Velocity	D1	22	40	21.80	4.03	.56
7	Landing Judgment	D1	28	30	18.51	4.65	.71
8	Minimal Movement	D1	20	40	25.34	4.56	.65
9	Drift Direction	D2	19	25	19.28	2.90	.59
10	Rotation I	B1	6	15	9.53	1.92	.19
11	Rotation II	B2	8	20	11.71	2.44	.42
12	Sequential Words	D1	10	30	11.78	7.37	.91
13	Successive Comparison	D1	7½	16	9.79	2.25	.33
14	Shapes	D2	16	40	18.90	3.72	.40
15	Shape Changes	D2	18	40	18.14	3.81	.41
16	Picture Identification	B1	10	20	9.60	2.98	.67
17	Successive Perception III	C1	11	20	10.69	3.64	.82
18	Successive Perception IV	C1	14	20	5.59	4.08	.86
19	Hidden Figures	B2	9	14	7.31	1.92	.31
20	Evolving Figures	E1	8	16	9.11	3.24	.74
21	Figure Detail Memory	G1	6	15	10.93	1.81	.22
22	Random Shape Memory	G1	8	32	23.04	3.36	.52
23	Speed Changes	E1	4	18	5.94	2.17	.26
24	Speed Estimation	E1	6	18	62.58	7.39	.73*
25	Motion-Time Translation	F1	10	16	8.55	3.00	.62
26	Social Abstracts IA	F1	13	6	20.12	4.82	.80
27	Social Abstracts IB	F1		34	16.97	5.54	
28	Social Abstracts IIA	F1	13	6	30.68	7.50	.91
29	Social Abstracts IIB	F1		34	21.64	7.57	
30	Story Frames	C1	20	80	56.65	4.84	.41

Table 2 (continued)

Variable No.	Name	Admin. Order[a]	Approx. Testing Time	No. of Items	Mean	Sigma	Reliability[b]
31	Story Sequences	C2	35	100	65.98	5.22	.63
32	Film Memory I	F1	2	1	13.44	3.81	.76*
33	Film Memory II	F1	2	1	8.06	3.08	.62*
34	Film Memory III	G1	2	1	20.88	2.31	.71*
35	Abstract Reasoning	E1	11½	16	10.48	1.85	.28
36	Sequence Memory	G1	4	35	16.47	5.33	.72*
37	Pattern Association	F2	4	21	3.76	2.86	.70
38	Color Form Recognition	F1	3	28	25.06	3.13	.74
39	Attention Span I	D1	10	20	73.55	15.17	.84*
40	Attention Span II	D2	10	20	41.25	8.71	.74*
41	Attention Span III	E1	4	12	4.08	1.85	.74*
42I	STVM I (-52 msecs.)	C1	The 8 parts of STVM I were administered during a total time of 18 mins.	8	3.75	1.66	.73*
43I	STVM I (10 msec. delay)	C1		8	4.96	1.67	.75*
44I	STVM I (94 msec. delay)	C1		8	1.93	1.39	.72*
45I	STVM I (177 msec. delay)	C1		8	3.55	1.40	.78*
46I	STVM I (260 msec. delay)	C1		8	2.66	1.44	.66*
47I	STVM I (344 msec. delay)	C1		8	3.15	1.50	.81*
48I	STVM I (428 msec. delay)	C1		8	3.14	1.49	.60*
49I	STVM I (510 msec. delay)	C1		8	3.42	1.31	.80*
42II	STVM II (-52 msecs.)	C1	The 8 parts of STVM II were administered during a total time of 16 mins.	8	3.50	1.65	.73*
43II	STVM II (10 msec. delay)	C1		8	5.14	2.11	.68*
44II	STVM II (94 msec. delay)	C1		8	2.81	1.45	.73*
45II	STVM II (177 msec. delay)	C1		8	3.32	1.59	.80*
46II	STVM II (260 msec. delay)	C1		8	3.55	1.50	.87*
47II	STVM II (344 msec. delay)	C1		8	3.03	1.44	.68*
48II	STVM II (428 msec. delay)	C1		8	3.86	1.57	.80*
49II	STVM II (510 msec. delay)	C1		8	3.13	1.56	.75*
42III	STVM III (-52 msecs.)	C2	The 8 parts of STVM III were administered during a total time of 16 mins.	8	6.65	1.65	.79*
43III	STVM III (10 msec. delay)	C2		8	5.09	2.04	.81*
44III	STVM III (94 msec. delay)	C2		8	3.01	1.52	.82*
45III	STVM III (177 msec. delay)	C2		8	4.19	1.80	.79*
46III	STVM III (260 msec. delay)	C2		8	5.48	1.52	.79*
47III	STVM III (344 msec. delay)	C2		8	6.64	1.47	.78*
48III	STVM III (428 msec. delay)	C2		8	6.14	1.69	.86*
49III	STVM III (510 msec. delay)	C2		8	6.24	1.63	.85*

Table 2 (continued)

No.	Variable Name	Admin Order[a]	Approx. Testing Time	No. of Items	Mean	Sigma	Reliability[b]
50	Plane Formation I	A2	All 3 parts administered during 15 mins.	9	39.46	3.34	.77*
51	Plane Formation II	A2		8	35.41	3.08	.79*
52	Plane Formation III	A2		11	45.51	5.07	.79*
53	Auditory Number Span	B2	10	24	9.17	3.18	.82*
54	Auditory Letter Span	F2	10	24	7.07	2.53	.90*
55	Visual Number Span	G1	10	24	12.88	3.15	.77*
56	Number-Word Association	E1	10	20	14.68	4.57	.79*
57	Position Recall I	F1	12	48	34.60	9.68	.81*
58	Position Recall II	F1	—	48	21.72	6.23	.74*
59	Space Memory	E2	15	25	21.15	4.69	.80*
60	Position in Succession	G1	9	40	24.19	7.48	.80*
61	Color Recall	B1	17	30	9.27	3.78	.61
62	Picture Group Naming	G2	6	24	16.37	2.71	.75*
63	Closure Speed	B1	3	24	17.40	3.54	.78*
64	Word Transformation	D1	10	20	35.01	10.17	.76*
65	Figure Classification	G2	6½	15	9.25	1.74	.68*
66	Figure Matrix	F2	7	15	11.34	2.68	.77*
67	Closure Flexibility	C2	10	49	114.62	18.99	.82*
68	Picture Classification	G2	13	30	21.74	3.38	.79*
69	Identical Pictures	F2	7	96	74.46	10.41	.76*
70	Hidden Patterns	A1	4	400	87.80	12.12	.79*
71	Copying	B1	6	64	39.12	8.94	.77*
72	Concealed Words	A1	6	50	23.75	5.70	.78*
73	Estimation of Length	A1	6	80	30.39	9.19	.82*
74	Picture-Number	A1	14	42	31.31	8.55	.83*
75	Addition	G2	4	120	49.41	10.78	.79*
76	Number Comparison	G2	7	96	49.56	7.79	.77*
77	Card Rotation	G2	8	28	177.22	28.70	.80*
78	Cube Comparison	F2	6	42	25.74	7.46	.80*
79	Maze Tracing Speed	G2	6	8	28.83	6.31	.71*
80	Choosing a Path	A1	14	30	19.64	7.10	.72*
81	Map Planning	B1	6	40	26.92	5.10	.79*
82	Wide Range Vocabulary	E2	12	48	26.37	7.28	.66*

Table 2 (continued)

Variable							
No.	Name	Admin Order[a]	Approx. Testing Time	No. of Items	Mean	Sigma	Reliability[b]
83	Camouflaged Words	C2	8	20	8.83	3.99	.80*
84	Disemvowelled Words	B1	6	30	15.24	5.11	.76*
85	Figure Analogies	F2	10	30	23.74	4.70	.78*
86	Color Memory	G1	8	20	13.66	3.12	.75*
87	Word Combination	E1	8	30	14.39	5.48	.73*
88	Position Memory	E2	9	20	14.06	5.73	.79*
89	Pattern Detail Memory	E2	16	15	9.67	3.51	.85*
90	Surface Development	G2	12	12	53.86	8.26	.79*
91	Paper Folding	G2	6	20	17.33	3.47	.69*
92	Near Point Visual Acuity	—	—	—	10.82	1.68	.74*
93	Color Sensitivity	—	—	—	5.18	.84	.78*
94	Far Point Visual Acuity	—	—	—	11.70	1.75	.75*
95	Viewing Distance	—	—	—	45.97	11.92	.75*
96	Viewing Angle	—	—	—	14.98	8.74	.70*

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[a] The letters A through G refer to the first through the seventh testing session. An appended "1" indicates that the test was administered prior to the mid-session rest period and a "2" indicates administration following the rest period.

[b] An asterisk in this column indicates that communality is reported; the other reported reliabilities are K-R 20 estimates.

THE FACTOR SOLUTION

From the complete intercorrelation matrix, presented in Table 3, three separate factor problems were extracted. These have been designated I, II, and III, denoting the particular short term visual memory test included in each. All of the other 88 variables were present in all three problems. No attempt to provide identical solutions for the three problems was planned for two reasons. First, since the problems differed only in terms of the short term memory variables, differences among the solutions might contribute to understanding of the storage process. The dimensions best able to describe the structure of each of the short term memory tests were sought. Second, it is believed that the amount of factor confusion involved in any rotated solution is directly proportional to the incompleteness of factorization. While Kaiser's (1963) recommendation was followed in choosing the number of factors to rotate, this rule is still recognized as an approximation to Harris's (1962) "best" number of factors. Differences between solutions could indicate incompleteness of factorization. Primary emphasis for further work could thus be placed on those factors with counterparts in all three analyses.

Problem III was treated first since the structure of Short Term Visual Memory III was expected to be the most complex. For this problem, both principal components analysis, with unity in the main diagonal, and image covariance analysis were computed. The latter method adopts the squared multiple correlations

SECTION 1

Var.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42I	4
1	48	28	25	17	00	09	19	-08	07	-06	16	15	-01	12	10	13	10	08	06	33	12	05	13	08	13	16	19	21	10	-05	09	14	-03	04	18	01	07	28	21	-04	17	1
2		39	20	40	02	07	26	02	17	17	06	34	10	12	17	16	12	11	16	10	15	-05	06	30	22	17	24	24	19	07	-02	01	01	09	13	06	29	14	10	-04	-02	0
3			29	15	-07	-11	03	-12	15	09	-02	06	13	-12	-02	-01	14	03	02	17	00	-05	06	13	-08	-11	-03	12	-06	-08	-09	20	02	-09	03	10	09	08	14	-12	-16	0
4				08	05	08	15	12	15	02	25	09	-10	10	03	10	05	14	-04	23	06	05	11	10	-02	05	04	07	21	02	03	12	05	09	04	18	05	20	26	09	21	2
5					-12	05	15	12	16	11	-04	19	-06	17	06	04	02	15	10	03	12	-08	12	33	17	24	19	20	19	04	22	-02	06	05	08	09	30	-02	06	-11	03	0
6						-04	12	15	09	02	06	06	-09	02	08	14	04	00	00	-08	07	01	04	15	-03	01	16	24	08	-02	04	-01	-02	23	17	13	03	-06	06	-04	16	-0
7							14	03	04	01	-01	17	-04	04	14	06	13	17	10	-04	20	18	22	16	26	13	18	-02	15	21	14	-10	05	25	08	22	13	-11	-02	29	16	0
8								23	15	26	33	21	04	15	34	43	41	16	15	16	17	10	23	49	25	29	34	22	32	21	27	09	-02	13	06	02	21	24	22	26	27	0
9									10	09	-02	12	-02	09	-05	05	-02	-05	13	01	01	-04	12	17	02	03	16	12	19	18	01	12	09	05	-18	04	13	03	03	15	17	0
10										17	32	27	-01	03	09	03	09	15	17	22	04	-06	19	17	25	25	28	24	25	17	18	23	-11	16	12	01	38	11	21	00	04	-0
11											11	16	17	06	11	20	11	18	13	01	06	19	03	15	26	17	22	26	14	08	16	07	00	13	-04	-01	07	02	10	-03	22	0
12												29	-16	06	44	45	36	08	10	09	11	13	15	30	18	31	30	29	30	10	26	26	14	08	18	01	12	36	33	40	13	1
13													04	12	27	21	24	27	30	07	13	03	10	34	36	30	40	28	25	-02	10	23	05	22	01	14	42	30	31	13	-01	0
14														16	-22	-08	-01	07	05	07	-08	20	-05	-03	10	-13	00	-08	02	-05	-26	03	18	01	05	-04	01	00	06	-22	00	0
15															-04	-07	-13	28	04	29	16	03	11	09	14	06	15	17	05	09	13	-03	05	09	12	07	24	16	26	-06	16	0
16																68	61	20	04	00	10	05	28	28	25	11	22	17	32	11	28	05	05	15	20	14	10	27	06	38	05	0
17																	67	11	07	-01	08	11	24	34	17	13	25	25	47	12	25	04	03	15	11	13	-04	28	14	38	09	1
18																		19	-03	04	05	-04	21	36	14	09	25	17	32	02	23	06	03	16	20	20	03	22	10	26	05	0
19																			21	23	10	-03	07	22	16	19	23	26	29	04	20	-02	-08	21	09	13	22	11	12	04	31	0
20																				17	06	14	08	31	33	28	26	35	23	13	17	18	-07	10	12	-08	06	26	33	21	31	2
21																					20	02	09	14	21	20	16	12	08	05	17	07	-05	-03	10	02	08	09	20	-10	17	0
22																						06	25	17	24	17	31	30	22	-05	14	03	03	01	08	25	12	02	02	24	10	0
23																							07	14	06	-05	-03	-08	05	-01	07	03	-02	05	00	09	-07	13	23	06	07	0
24																								21	10	14	15	15	38	17	26	14	-08	09	-01	02	05	08	07	18	02	0
25																									28	23	42	31	32	11	31	15	05	32	14	20	40	27	25	31	20	0
26																										26	63	39	40	26	14	14	-04	18	22	06	26	13	16	29	12	0
27																											37	34	18	05	30	15	-01	16	07	-09	22	12	15	12	18	0
28																												65	30	23	23	15	-02	23	33	04	38	14	20	31	11	0
29																													46	06	17	09	12	14	25	15	26	26	29	20	10	24
30																														17	16	02	-06	18	01	18	21	22	20	41	23	13
31																															03	04	-09	-01	-05	05	05	-04	04	19	20	04
32																																08	04	17	07	08	10	22	23	08	26	21
33																																	-03	02	-02	-05	13	31	25	08	06	00
34																																		06	00	-02	06	06	-01	03	-12	02
35																																			12	18	30	03	12	18	24	-03
36																																				-02	19	09	02	08	02	-10
37																																					18	07	06	20	11	15
38																																						13	11	08	01	-10
39																																							69	24	26	44
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Note: Decimal points omitted.

SECTION 2

Table 3

Correlation Matrix Including All 112 Variables

41	42I	43I	44I	45I	46I	47I	48I	49I	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
04	17	14	03	16	19	18	23	16	14	05	-01	23	11	21	01	08	14	-01	18	01	02	15	10	23	25	03	09	17	06	-03	01	00	15	-16	07	08	03	-04	14	14	04	25	08	13	08	02	-07
04	-02	04	17	10	29	38	17	14	28	15	16	14	09	08	08	26	13	10	26	09	05	13	05	26	22	18	23	13	17	14	13	01	18	04	09	26	29	16	35	39	05	04	14	27	07	-05	01
12	-16	04	18	-11	11	02	14	08	18	06	23	01	10	11	09	23	04	19	22	10	06	24	21	26	30	22	12	17	16	19	06	-10	17	08	13	02	19	-07	24	20	11	13	11	12	03	06	10
09	21	26	15	09	25	10	14	16	16	07	21	13	13	-01	01	17	00	04	20	09	-04	24	11	-14	06	09	10	15	31	21	14	00	05	08	21	05	02	05	09	18	07	14	23	18	02	16	-06
11	03	07	15	03	08	21	10	17	30	15	18	05	04	07	15	25	18	11	23	-05	20	13	-07	22	34	26	07	11	16	41	02	12	22	-08	13	17	23	33	28	26	12	02	03	29	05	-08	18
04	16	-05	-04	02	08	-03	-15	07	-19	-09	06	-08	-13	-08	14	17	28	-03	19	10	-10	-01	11	-02	-09	10	19	06	01	02	09	05	14	09	06	19	08	02	14	04	-04	04	06	07	02	02	01
29	16	01	-04	02	-04	17	-01	-01	-03	23	-06	07	-08	04	-15	07	06	04	02	02	00	-02	-07	04	05	18	-09	-05	04	08	07	03	11	-07	11	12	04	07	10	13	02	02	-01	13	03	-19	03
26	27	07	06	19	36	20	16	18	15	14	17	-04	-12	-08	24	25	17	11	18	05	-13	06	16	-04	13	12	07	05	23	26	28	-02	24	08	-02	33	21	28	10	19	02	11	19	16	04	15	23
15	17	07	10	14	23	03	00	-06	04	05	11	00	04	-05	01	06	00	09	-05	-03	17	-05	10	-10	12	12	-06	-09	15	21	06	08	-04	-14	03	25	11	-01	10	12	12	15	-04	20	00	10	04
00	04	-03	02	01	14	04	-09	16	18	35	20	18	13	22	15	24	28	20	29	17	-01	17	15	05	16	43	14	26	20	28	09	-03	20	-02	14	20	22	31	18	30	07	07	13	24	14	07	06
03	22	07	11	14	13	06	12	-12	12	01	11	03	-04	03	-01	08	10	04	13	-10	-08	34	08	-08	20	26	33	16	12	14	09	06	02	-20	-10	28	14	27	24	04	25	14	00	18	15	01	08
40	13	12	03	23	32	24	08	23	05	03	14	13	13	11	-06	00	06	-09	17	03	08	08	34	-09	05	08	04	14	16	13	24	-08	04	17	-01	03	04	11	03	19	22	26	25	31	-03	36	-12
13	-01	02	-02	22	30	28	13	17	27	24	13	10	21	20	13	22	21	09	23	25	12	05	24	13	36	18	10	11	10	25	12	08	17	-07	02	15	24	19	30	10	20	18	23	18	18	15	14
22	00	09	13	-02	-01	-22	05	18	08	-01	-08	05	10	10	09	-02	04	-04	-10	10	04	-14	20	09	15	04	02	03	11	09	-06	01	04	15	10	17	07	10	12	00	-08	06	08	00	-08	01	24
06	16	07	-16	-01	11	17	11	09	08	03	15	20	06	13	02	01	08	09	10	04	-09	-16	06	13	14	04	05	09	-03	19	-12	22	09	04	08	12	06	15	08	02	07	13	20	00	06	-03	07
38	05	06	07	19	10	29	05	12	-98	06	03	04	01	00	06	10	15	04	14	-10	-16	26	04	07	-04	12	18	04	10	03	18	07	12	00	-03	16	14	11	04	04	01	-11	06	17	02	07	-13
38	09	16	20	26	23	21	14	14	-06	-10	-06	10	-06	-07	-03	09	01	-02	09	-11	-16	21	17	-05	-05	03	06	-15	08	-02	17	04	08	-13	-21	11	15	04	06	03	15	03	09	18	03	16	-02
26	05	09	15	16	10	12	09	02	-08	07	-00	12	-02	-02	05	28	12	09	05	06	01	31	20	00	14	16	15	08	13	11	29	-03	07	00	-10	19	19	15	06	11	19	10	18	14	-02	23	06
04	31	08	00	-02	10	14	08	06	27	19	17	00	03	-09	23	23	12	01	18	13	-01	24	22	20	32	28	23	10	21	16	22	14	21	-06	10	24	21	16	26	-01	04	18	18	23	14	04	09
21	31	22	-01	24	22	24	18	19	16	18	01	11	13	-06	13	-01	-08	15	-02	05	16	01	14	08	24	09	20	14	20	-01	08	09	-02	14	04	28	28	13	39	18	05	03	07	38	18	09	15
10	17	05	01	03	17	11	11	17	19	18	05	21	02	14	26	12	07	19	18	17	-03	08	-01	15	20	21	19	20	10	11	03	01	04	-10	-05	06	-01	11	20	03	-05	01	-03	05	17	03	10
24	10	07	08	05	21	40	17	11	15	11	03	-04	-20	01	14	12	00	24	14	19	07	15	00	16	14	27	18	09	04	15	05	-01	21	-18	-01	11	05	01	24	08	05	08	08	18	13	-04	15
06	07	05	02	06	01	07	10	06	13	20	00	04	-01	-07	-03	-11	03	-04	-10	-05	-11	12	-01	-09	04	02	02	-08	05	04	-04	09	-07	-02	01	16	14	08	-03	-08	-16	07	-01	03	-07	03	11
18	02	06	-01	10	13	19	03	10	-03	08	04	14	07	03	08	08	-01	10	01	09	-04	04	00	02	08	07	07	02	01	09	05	-08	24	-03	11	05	04	08	07	11	00	07	05	13	12	01	08
31	20	04	10	16	26	32	12	15	28	28	30	-01	02	-07	21	33	13	28	15	11	17	13	28	24	36	36	16	11	34	29	29	22	18	20	11	39	47	31	36	36	20	20	23	45	09	24	27
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39	39	-07	12	15	06	24	10	14	-28	07
40	30	08	16	17	15	22	03	05	-19	07
41	04	02	15	12	10	01	33	35	-28	14
42	10	08	26	25	19	00	17	16	-04	01
43	12	-05	09	12	09	14	08	-03	-04	-13
44	21	09	17	29	11	-02	11	-01	-03	-02
45	17	03	18	21	03	13	19	14	-17	13
46	30	-01	19	20	21	15	10	14	-11	-06
47	07	-15	24	23	35	07	18	13	-08	-06
48	12	01	14	08	13	03	-01	04	-05	-04
49	19	14	03	00	12	09	12	05	-24	09
50	17	29	22	31	30	-08	12	-14	-04	13
51	-05	14	23	39	43	00	34	-04	00	05
52	14	16	20	30	29	05	10	-09	00	01
53	-07	07	-01	09	-08	-01	-08	-13	-03	-22
54	02	03	00	13	-06	-09	-05	-20	-12	-08
55	05	08	21	11	10	06	-01	-08	-18	08
56	15	49	37	25	22	-09	-02	18	02	-03
57	14	48	37	28	25	-08	-04	04	04	-08
58	06	26	19	18	20	02	-16	01	-06	19
59	04	41	44	17	18	-02	-12	04	07	-11
60	04	16	30	23	23	04	03	23	05	05
61	20	24	22	05	10	-12	-04	01	05	-05
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63	22	-06	33	25	32	17	16	04	05	02
64	52	18	16	17	08	14	-01	00	-18	-10
65	-02	09	06	23	29	-07	-06	-01	06	-11
66	21	11	26	34	32	-07	-05	-01	-07	03
67	22	26	34	51	45	-01	07	01	02	-03
68	11	-02	41	43	33	02	-10	04	-05	10
69	27	13	26	26	11	18	-09	-08	06	06
70	33	20	24	43	30	09	01	01	-15	12
71	13	26	13	27	30	09	-06	-08	00	-02
72	36	04	12	19	23	13	16	21	-24	-10
73	13	13	09	19	09	06	05	-02	17	08
74	08	52	34	13	12	07	-07	11	-17	-07
75	30	06	02	-01	03	-08	-03	08	-10	08
76	10	09	11	14	11	04	-02	-18	01	-06
77	16	26	16	45	39	13	06	17	03	-06
78	06	25	31	39	41	-14	-04	12	-16	-08
79	13	12	21	38	35	16	05	11	01	08
80	06	30	38	34	33	01	-11	-01	-04	-05
81	19	16	16	24	37	03	-04	03	11	-04
82	31	08	27	15	01	11	-13	08	-11	00
83	39	03	24	06	06	05	-04	-03	-27	01
84	35	05	30	13	09	08	08	07	-14	02
85	41	07	26	42	40	03	08	13	-14	-06
86	06	26	24	22	20	00	06	12	07	-07
87		09	14	11	06	03	03	-09	-23	11
88			30	15	03	-08	-07	-06	-12	00
89				39	29	-06	-08	04	-05	05
90					56	-07	07	19	-01	04
91						01	07	22	00	-04
92							08	31	-09	-13
93								20	-10	07
94									-16	05
95										-32

Var.	42 II	43 II	44 II	45 II	46 II	47 II	48 II	49 II
1	19	04	21	10	15	12	20	19
2	08	14	28	13	06	18	16	14
3	13	-01	09	-05	03	08	04	-03
4	28	12	16	-02	03	26	17	-04
5	05	11	09	07	08	19	04	11
6	20	04	07	-09	04	-01	-22	-11
7	19	15	10	-05	-16	10	19	01
8	18	46	24	20	13	30	23	24
9	12	10	17	16	21	11	08	02
10	-03	06	11	12	03	02	-06	05
11	10	07	01	23	09	05	03	10
12	28	53	17	26	22	24	20	33
13	23	20	18	33	23	12	14	21
14	-08	-11	-11	05	13	-01	03	-04
15	01	00	-15	-08	00	02	-10	07
16	17	43	20	09	10	36	10	27
17	24	55	25	24	20	40	21	32
18	15	38	10	19	16	29	20	28
19	16	06	07	-05	06	13	01	09
20	31	15	21	18	19	27	25	21
21	14	-02	13	-03	01	04	07	13
22	20	17	15	15	05	04	13	27
23	-08	04	-02	05	-02	07	03	03
24	07	34	28	05	09	15	12	23
25	26	38	26	20	13	26	19	28
26	15	23	29	26	15	11	23	26
27	15	19	10	09	12	07	18	23
28	20	26	26	22	19	13	21	32
29	34	35	26	27	18	11	18	32
30	26	44	32	30	23	32	23	32
31	-08	08	18	02	12	23	12	08
32	07	29	18	17	07	23	08	30
33	08	09	15	16	13	-03	17	14
34	17	09	-02	02	-15	-04	03	-12
35	23	10	09	-07	06	19	07	04
36	07	03	14	-06	02	08	06	10
37	12	10	18	11	12	10	02	14
38	07	14	16	04	02	06	03	-02
39	31	36	39	34	52	36	35	46
40	30	23	21	39	61	32	21	33
41	32	45	26	12	14	30	25	29
42	41	20	21	16	28	28	23	16
43	39	29	33	34	36	42	40	26
44	12	12	37	31	32	28	21	18
45	25	22	39	44	43	42	38	36
46	29	31	35	33	35	24	25	24
47	32	43	31	37	19	23	35	44
48	28	23	17	40	28	30	27	33
49	22	31	39	18	17	34	17	39
50	-01	-05	15	09	14	04	28	20
51	-03	00	-01	00	00	03	10	12
52	09	04	05	10	03	07	08	11
53	-03	07	19	13	08	-06	08	-03
54	-10	-06	06	10	13	-03	-09	-13
55	-07	-07	-07	00	07	-09	-12	01
56	14	01	18	05	01	-03	-14	11
57	20	04	15	01	-01	01	-01	-05
58	-01	02	03	14	17	-09	-08	00
59	10	-03	09	-10	-10	-06	01	-13
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62	03	-03	12	02	06	03	01	12
63	21	08	16	12	-08	18	10	17
64	28	13	18	15	27	05	09	20
65	-01	-02	-09	-08	-07	-08	-12	08
66	08	09	09	12	22	08	07	23
67	13	04	18	07	01	03	-17	14
68	07	08	12	05	22	08	00	10
69	03	-01	10	05	21	10	-05	20
70	20	15	24	12	09	23	10	21
71	10	07	-04	-03	13	04	-07	-06
72	20	20	09	14	05	13	06	30
73	10	-06	03	-04	14	10	-06	03
74	01	08	20	03	-03	-04	-16	04
75	09	10	00	-08	13	11	03	04
76	06	-03	19	10	23	27	-06	18
77	01	-01	11	02	05	09	-01	17
78	18	11	14	18	05	12	-05	09
79	-05	-01	00	10	14	07	05	14
80	22	06	20	07	26	11	01	15
81	13	19	26	11	24	18	14	14
82	23	12	04	37	24	-07	07	21
83	27	11	15	20	21	-05	12	23
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85	24	26	26	10	16	17	07	29
86	19	04	34	22	06	07	13	13
87	16	14	13	13	20	-02	01	20
88	02	05	04	08	04	-07	-04	05
89	33	10	13	10	-04	11	17	10
90	20	08	16	13	20	20	07	22
91	19	10	10	17	22	08	19	22
92	06	20	10	08	17	13	23	26
93	09	23	22	02	-03	21	13	20
94	10	23	18	-01	09	17	17	23
95	-12	-43	-14	-16	-15	-16	-11	-06
96	05	-08	-10	02	23	01	03	06
42II		39	33	28	16	35	35	19
43II			34	29	21	33	43	38
44II				36	31	36	42	36
45II					33	28	40	30
46II						36	35	46
47II							29	37
48II								37

Var.	42 III	43 III	44 III	45 III	46 III	47 III	48 III	49 III
1	18	03	21	01	00	-07	01	20
2	16	08	00	03	02	05	02	14
3	06	-01	00	04	08	02	04	17
4	19	02	11	23	10	20	11	22
5	21	10	05	02	03	-07	14	09
6	11	02	05	08	-04	-04	08	07
7	12	15	-05	09	-03	-10	-06	07
8	25	38	15	19	08	28	24	29
9	06	13	-01	10	10	20	11	19
10	15	-05	00	04	-03	03	07	14
11	04	12	00	-04	-12	06	-04	-01
12	41	46	21	26	12	27	33	38
13	26	20	11	17	-05	04	16	20
14	-15	-10	-07	-07	-01	03	-16	-11
15	05	05	20	-07	-09	17	03	-11
16	33	62	11	23	20	24	33	37
17	36	62	07	38	25	26	44	44
18	20	44	15	23	17	16	31	35
19	28	06	08	13	11	03	08	11
20	25	17	22	15	07	26	18	14
21	02	-07	22	04	09	21	03	02
22	14	10	17	11	01	14	09	15
23	02	21	-08	02	-13	03	-06	-06
24	18	30	04	09	11	21	17	16
25	32	36	12	18	06	18	27	27
26	18	29	22	06	06	07	18	15
27	23	13	11	11	01	19	10	25
28	22	31	11	03	07	12	13	12
29	37	32	26	12	03	16	20	26
30	36	39	11	21	26	24	37	38
31	10	08	-03	08	-03	12	06	08
32	30	28	21	29	23	19	25	20
33	22	01	26	12	04	10	08	19
34	16	14	04	17	10	06	13	17
35	24	17	10	02	01	00	13	03
36	-01	03	12	-09	-01	03	-03	-07
37	20	17	13	04	07	-04	13	12
38	21	13	08	02	-09	04	07	12
39	62	36	32	33	36	41	46	60
40	42	24	35	36	12	36	38	32
41	33	30	14	26	21	31	25	41
42	31	21	28	38	26	26	26	27
43	40	26	32	49	33	40	42	43
44	29	10	20	41	30	18	23	29
45	18	13	25	40	17	26	38	35
46	33	23	18	31	20	24	23	32
47	39	31	27	32	27	20	31	35
48	35	24	31	44	30	45	33	40
49	39	28	29	31	15	21	35	36
50	03	-04	-01	03	00	10	02	08
51	16	05	-01	-05	08	14	05	09
52	12	02	06	05	02	19	05	08
53	02	-10	14	00	-13	-07	-14	-13
54	-10	-13	01	-04	-16	-07	-11	-10
55	-10	-03	04	-10	-24	-10	-11	-08
56	17	01	12	04	02	12	10	11
57	17	03	03	-07	02	-03	10	13
58	11	01	14	04	07	10	09	08
59	-01	04	11	00	-08	10	09	06
60	20	09	16	-01	-02	-05	14	13
61	14	-06	19	-08	04	13	04	03
62	09	-08	06	-06	-13	-02	-04	08
63	06	03	07	06	-01	04	03	14
64	20	06	32	38	09	12	14	26
65	-02	-03	03	-16	-08	-08	-01	04
66	26	12	09	03	-02	00	-04	08
67	18	03	06	13	03	09	06	14
68	05	10	23	00	02	13	00	04
69	20	-03	36	00	00	05	00	06
70	23	13	12	23	13	23	10	10
71	15	-08	00	03	03	03	03	07
72	24	11	10	33	13	18	16	26
73	12	10	22	23	03	23	22	13
74	13	04	07	-04	-07	01	07	06
75	13	01	16	13	06	18	14	08
76	24	00	16	11	13	12	03	03
77	03	06	12	-08	-09	04	-03	-12
78	21	14	01	05	01	11	11	13
79	04	07	05	-02	-07	07	06	-06
80	20	00	14	10	01	16	14	09
81	33	12	09	10	10	26	16	26
82	16	01	13	14	-03	-03	09	14
83	16	00	23	23	01	08	03	13
84	16	04	16	13	03	03	04	10
85	33	17	10	08	13	16	11	22
86	04	-01	22	-02	16	08	20	-01
87	17	07	08	20	03	11	03	13
88	-03	-02	04	-07	-10	04	16	-04
89	18	14	20	23	-01	12	11	20
90	21	12	10	08	14	16	17	16
91	23	20	05	12	22	16	14	18
92	22	14	22	06	-06	03	22	13
93	12	28	-03	07	13	21	19	20
94	29	38	14	15	22	16	36	34
95	-21	-35	-10	-13	-08	-17	-21	13
96	-08	10	-04	-08	01	09	-02	00
42II	44	30	31	46	37	25	43	47
43II	36	60	46	42	35	33	60	37
44II	25	46	38	29	37	34	29	35
45II	25	25	32	48	40	40	38	36
46II	37	19	35	42	33	23	44	36
47II	46	30	29	46	33	47	43	43
48II	33	37	28	40	33	37	41	40
49II	46	42	44	36	40	41	42	37
42III		31	31	53	46	42	44	44
43III			20	42	39	40	56	55
44III				47	36	38	32	36
45III					56	49	61	44
46III						48	53	56
47III							56	53
48III								71

between each variable and all others in the matrix as communality estimates, and adjusts off-diagonal elements to maintain a Gramian matrix (see Guttman, 1953, and Kaiser, 1963). From the principal components solution, it was determined that 30 factors were associated with latent roots greater than unity. Image analyses were then accomplished for problems I and II. In all three problems, the first 30 image factors were chosen for rotation using Kaiser's (1958) orthogonal varimax criterion. Image correlation matrices, for problems I, II, and III, are presented in Tables 4, 5, and 6, respectively. Unrotated and rotated factor matrices appear in Tables 7, 8, and 9, and Tables 10, 11, and 12, respectively. The principal component results for problem III are not included.

In presenting and interpreting factors, only those variables with loadings of .30 or more from at least one analysis have been used. Factors appearing in all three analyses are designated by an alphabetic letter other than "X." A subscripted "X" has been adopted to denote factors not provided by all analyses. When a variable loads significantly on factors other than the one under consideration, these factors and loadings have been included in parentheses next to the current factor loading. Asterisks denote variables hypothesized to appear in obtained factors. Three columns of loadings, for problems I, II and III, are presented. Dashes (—) in a column indicate that no comparable factor appeared in that analysis. Parenthetical arabic numbers at each column head refer to the columns of Tables 10, 11, and 12.

SECTION 1

Var.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
1	47	27	25	17	00	10	18	-07	07	-05	16	15	-01	.3	10	12	10	08	06	33	13	05	13	08	12	16	19	20	10	-06	-08	15	-04	08	18	01	08	29	21	-04	16
2		39	21	40	02	06	26	01	19	17	05	33	10	11	18	16	12	11	16	11	14	-05	06	29	22	17	24	24	19	06	-03	01	02	10	13	06	28	14	09	-05	-02
3			29	16	-06	-12	03	-12	16	09	-03	05	13	-11	00	00	13	05	00	16	-01	-03	04	14	-07	-03	-04	13	-05	-06	-09	16	02	-06	02	10	09	09	13	-12	-16
4				07	06	09	14	13	16	03	23	08	-11	10	05	10	06	15	-05	21	06	06	09	11	-02	06	04	06	21	02	04	13	04	08	02	17	06	20	23	09	21
5					-12	05	16	11	16	10	-03	.9	-08	16	06	05	01	16	10	05	12	-08	13	31	17	23	20	21	17	03	22	-03	07	06	06	10	30	-02	06	-09	03
6						-03	11	15	10	03	05	05	-09	01	09	13	05	03	-02	-09	05	02	02	13	-04	02	16	23	09	-04	04	00	-03	23	14	13	03	-03	03	-03	13
7							13	05	04	03	-01	17	-04	05	12	05	15	18	10	-05	21	16	21	16	25	13	19	-03	16	18	16	-06	03	23	07	21	14	-10	-01	-03	13
8								22	16	25	34	21	03	15	34	46	41	16	15	17	17	11	23	49	26	29	34	23	32	22	26	08	-01	13	06	03	21	23	22	26	28
9									09	10	-02	12	-03	10	-06	04	-01	-05	13	00	02	-05	11	18	02	03	13	21	20	17	03	14	08	03	03	03	13	04	04	16	16
10										17	31	26	-02	03	11	03	08	16	16	22	03	-05	18	17	25	26	28	24	26	16	18	23	-10	18	12	01	37	11	20	00	03
11											11	16	17	06	11	19	12	19	13	00	07	19	02	16	25	17	22	25	13	07	18	09	-01	12	-04	-02	07	02	10	-03	21
12												30	-16	06	43	45	36	07	11	10	11	12	16	30	18	30	29	29	29	11	26	26	13	08	19	01	12	36	33	39	14
13													05	13	26	21	24	25	31	08	14	03	11	34	36	29	40	29	25	-01	11	23	03	20	03	14	42	30	32	13	-01
14														14	-22	-07	-02	08	06	09	-07	20	-04	-05	10	-15	-01	-07	00	-03	-26	02	-17	01	-06	-03	01	00	07	-20	00
15															-03	-08	-13	26	04	27	16	04	10	10	14	07	13	17	06	11	14	-05	04	07	13	03	26	17	27	-07	16
16																69	60	20	03	-01	10	07	27	29	25	12	22	17	38	11	27	03	05	17	20	14	10	27	04	38	05
17																	65	11	07	00	08	12	23	34	19	13	23	26	67	13	24	01	04	16	11	13	-04	27	14	39	10
18																		19	-03	03	06	-05	21	37	14	09	23	16	33	01	24	08	02	13	20	19	03	22	10	26	05
19																			19	22	09	-04	06	22	13	20	24	26	29	08	20	-01	-08	23	05	12	21	12	11	06	30
20																				18	08	13	10	30	36	27	26	33	22	14	17	18	-07	09	14	-07	06	23	33	20	32
21																					20	03	12	12	21	20	17	14	07	03	16	06	-03	-01	10	06	08	08	13	-10	19
22																						04	25	16	25	13	31	30	21	-03	13	04	03	-01	10	23	14	08	04	24	10
23																							07	14	07	-04	-04	-07	03	00	06	00	-01	07	-01	10	-08	13	22	07	08
24																								20	12	13	13	16	36	18	25	14	-06	09	00	-01	05	07	07	18	03
25																									28	24	41	30	33	11	31	13	04	31	15	20	40	28	23	30	20
26																										26	62	40	40	27	13	03	-03	18	23	06	27	12	16	28	13
27																											37	34	19	05	30	14	-01	17	07	-09	22	13	14	12	10
28																												65	30	22	23	16	-02	24	31	05	37	14	19	31	11
29																													65	07	16	08	13	16	23	16	26	26	28	21	10
30																														16	17	03	-07	18	02	18	21	23	21	40	22
31																															02	00	-08	-01	-04	06	06	-03	04	17	10
32																																11	02	14	07	07	11	23	24	09	25
33																																	-05	-01	-01	-06	14	32	26	08	05
34																																		-04	-01	-01	03	06	-02	03	-11
35																																			09	20	28	03	09	19	25
36																																				-02	20	09	05	06	01
37																																					18	06	04	19	12
38																																						13	12	09	00
39																																							68	24	25
40																																								16	22
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Note: Decimal points omitted.

SECTION 2

Table 4

Image Correlation Matrix for Factor Problem I

42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83

60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	Var.
18	01	03	14	11	23	24	04	09	17	06	-03	01	00	15	-15	06	07	04	-04	14	14	03	24	09	13	08	02	-06	06	15	15	12	-03	05	-12	-03	1
25	10	05	13	04	27	24	17	22	12	16	15	13	02	18	03	09	27	29	15	36	38	05	05	13	27	07	-05	01	19	39	33	00	-12	12	-02	-12	2
20	12	07	24	19	25	30	22	10	18	17	19	07	-11	18	08	13	04	18	-07	24	20	11	13	10	10	04	07	08	17	19	26	-06	-12	-03	02	-07	3
19	10	-03	22	12	-15	06	10	09	15	32	22	13	-01	04	09	21	04	02	05	10	17	05	14	23	18	06	15	-04	21	12	07	15	03	00	-07	06	4
22	-06	19	14	-07	23	34	25	07	12	16	40	02	12	22	-08	13	18	24	35	28	28	13	-02	03	27	05	-05	17	19	21	31	-03	-07	00	09	-16	5
19	09	-09	-02	10	-02	-09	09	19	06	03	04	08	05	13	09	04	20	07	01	13	04	-05	04	07	07	04	03	02	07	-01	01	11	-07	16	-02	06	6
03	00	01	-03	-07	04	04	18	-08	-06	05	08	-08	03	09	-05	09	11	04	07	08	13	00	-03	00	14	03	-20	07	26	12	11	03	19	03	00	-14	7
18	06	-13	07	17	-04	14	12	07	06	22	26	29	-02	25	07	-01	34	21	28	11	19	04	12	18	16	04	15	22	23	11	14	23	16	31	-46	02	8
-04	-04	18	-05	10	-11	11	13	-05	-10	16	21	05	07	-05	-12	02	23	11	-01	09	12	10	14	-03	21	01	09	05	-09	10	07	08	17	-03	-02	-06	9
28	18	00	17	14	06	18	42	13	26	20	28	09	-03	20	-03	13	21	21	30	18	29	07	-07	13	23	16	07	05	15	29	32	14	07	08	-02	-11	10
14	-11	-07	34	08	-08	19	26	34	15	13	15	08	06	01	-19	-11	28	14	26	24	04	24	13	00	18	15	00	09	25	27	18	26	-01	-01	-08	-01	11
17	03	07	09	34	-09	05	08	05	14	16	12	24	-07	04	16	00	03	05	12	05	19	23	27	24	31	-04	36	-12	05	12	10	27	12	33	-49	08	12
24	24	12	06	24	12	35	19	11	11	10	24	12	08	17	-07	02	14	25	20	29	11	20	18	22	18	17	15	14	32	24	29	14	-02	14	-20	00	13
-11	09	03	-12	18	09	15	04	03	04	10	07	-05	02	08	14	11	17	08	13	11	02	-06	07	08	-02	-08	03	24	-03	12	01	-11	-24	-13	06	00	14
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13	-09	-15	25	04	06	-02	12	17	04	10	03	18	06	12	00	-03	17	13	11	05	04	02	-10	06	17	-01	07	-14	13	25	26	25	27	43	-36	15	16
08	-10	-16	21	17	-06	-04	04	06	-14	08	-03	18	04	09	-13	-20	12	15	06	06	03	16	04	08	17	03	18	-03	10	18	10	25	27	46	-41	08	17
06	05	02	31	20	00	13	16	16	07	13	11	28	-03	06	01	-11	18	19	15	06	10	18	09	19	16	-02	22	07	28	27	25	17	15	40	-37	03	18
17	13	00	23	20	21	32	26	23	11	22	17	21	14	20	-06	09	24	20	15	25	00	04	18	19	22	16	05	09	27	27	29	00	11	14	-08	07	19
-01	04	14	03	13	08	24	09	21	14	19	-01	08	10	-01	14	05	27	29	14	39	19	05	04	06	38	16	09	15	18	29	28	00	08	03	00	-11	20
18	17	-04	09	-01	16	21	20	19	20	09	11	04	03	06	-12	-03	07	00	13	20	04	-03	02	-03	04	15	05	09	17	16	13	-02	06	04	-04	00	21
15	17	07	15	00	15	13	28	19	08	04	14	06	-01	21	-17	-00	09	06	04	24	08	04	08	08	18	12	-03	17	41	25	27	06	11	04	-09	-06	22
-12	-03	-11	-12	00	-09	05	01	01	-07	04	04	-03	09	-06	-03	02	18	14	08	-01	-08	-14	07	-02	02	-06	03	10	-04	07	-01	09	13	-10	-09	07	23
02	09	-05	06	00	03	08	06	07	03	00	08	06	-06	25	-05	12	05	05	09	07	12	01	08	04	13	10	02	07	19	03	12	03	25	11	-12	-16	24
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28	14	11	07	-07	04	36	23	32	18	14	03	-10	04	11	-02	04	28	11	27	21	22	12	04	08	22	26	01	15	34	33	35	-07	19	09	-10	21	26
21	-01	03	12	09	11	22	08	28	08	13	11	14	-07	-07	01	-13	13	19	22	25	17	10	15	03	27	03	11	-02	24	24	26	04	12	13	-19	03	27
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31	16	27	21	16	19	47	25	38	17	04	06	08	-09	12	-13	-02	28	35	14	26	14	22	30	14	38	21	14	05	23	29	38	17	-04	18	-13	-07	29
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04	-22	09	-09	00	-08	03	13	04	08	04	00	-15	-13	16	02	05	07	-01	03	14	17	-10	-10	-11	-01	-01	-06	11	04	11	04	-04	20	02	-09	-02	31
10	09	04	25	11	02	14	21	22	13	12	13	13	17	06	-07	03	24	09	32	19	18	12	05	00	30	19	16	07	25	12	21	16	13	20	-10	-24	32
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06	02	11	-04	-10	-09	-03	07	-08	-09	01	-02	01	09	-04	-08	-16	-10	04	-06	01	-03	13	-01	-13	19	-13	12	-05	08	-02	-11	06	-12	02	-04	-01	34
21	04	00	13	13	-00	05	05	16	01	12	01	05	21	00	-02	11	38	28	19	16	12	06	-03	02	11	13	-03	12	26	24	23	18	-03	23	01	-06	35
02	04	02	13	03	11	01	08	20	22	12	00	07	12	02	09	03	19	-02	16	14	12	00	-06	04	17	-07	09	02	04	08	11	12	-02	06	-14	12	36
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28	17	08	-01	21	15	38	24	12	20	20	36	-02	16	32	05	10	17	34	17	17	28	06	05	20	24	17	-08	19	35	27	27	07	-11	04	-05	-05	38
-02	03	-01	06	47	-06	13	00	10	27	21	07	21	13	-01	26	25	02	12	05	09	12	24	42	31	31	09	39	-06	12	16	07	25	08	14	-29	07	39
08	15	05	-01	39	-02	21	05	05	27	16	17	13	05	09	19	25	01	17	22	13	22	15	34	31	27	07	30	08	17	17	14	21	04	06	-19	04	40
02	00	04	-10	13	-12	-04	05	02	-11	13	-05	11	05	01	02	00	03	10	-09	-04	17	04	13	15	22	01	06	02	15	11	09	00	33	36	-29	13	41
05	-05	-07	12	21	-09	10	19	15	15	34	01	13	28	00	09	18	26	17	16	19	18	04	05	06	20	09	10	08	25	24	18	00	16	16	-03	01	42
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07	07	06	11	22	-07	09	15	04	05	23	05	07	-03	17	03	09	01	12	11	12	20	15	18	03	20	04	20	10	16	27	09	-03	11	01	-02	-03	44
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06	14	04	10	28	01	16	09	10	09	24	11	16	07	05	06	07	02	08	13	15	24	17	21	22	19	-01	28	01	20	20	21	17	12	13	-12	-05	46
-07	18	-02	16	04	30	21	15	19	07	08	07	13	06	03	00	09	01	17	17	22	25	14	15	16	26	05	08	-16	24	23	36	06	17	12	-08	-06	47
-09	12	04	09	10	10	19	07	11	09	05	04	02	02	00	-12	-01	02	05	11	12	18	07	20	01	10	08	11	02	14	10	14	07	00	01	-06	01	48
14	18	11	-02	03	03	07	11	00	10	16	05	11	08	07	06	15	-02	10	09	04	23	-12	-04	04	02	08	17	15	04	01	14	10	14	03	-25	10	49
06	14	12	10	18	15	40	25	16	16	11	37	04	01	11	00	08	16	21	27	26	23	-12	19	08	12	18	16	28	21	30	29	-10	11	-13	-03	12	50
12	18	07	-01	00	07	35	27	13	22	15	38	03	03	10	12	18	18	28	29	11	23	-14	-04	-01	07	14	-03	14	22	38	42	-01	33	-03	00	05	51
22	10	05	14	23	15	19	32	03	23	29	44	20	03	30	19	20	15	26	21	08	23	09	08	16	18	16	14	17	20	30	28	07	11	-09	-01	02	52
08	11	04	-06	11	09	-05	-03	00	16	13	03	01	-03	15	-09	15	03	15	-06	10	04	09	09	06	13	09	-06	08	00	10	-07	00	-07	-16	-04	-22	53
02	-08	06	-05	21	08	-03	-02	00	05	22	00	08	01	09	12	22	-02	21	-11	14	-06	18	05	11	09	-02	03	02	00	12	-06	-11	-06	-19	-11	-09	54
16	02	14	-02	13	03	20	-04	16	25	14	01	-08	05	09	11	23	-05	07	07	04	09	08	07	10	01	09	05	07	21	10	10	06	-03	-09	-16	09	55
35	30	09	-01	10	14	16	33	21	12	17	17	15	06	50	07	09	25	35	18	25	13	-08	-02	04	14	29	14	50	38	25	22	-08	-01	17	01	-02	56
45	38	16	09	21	19	24	32	17	18	10	30	01	09	41	02	14	26	32	17	21	34	04	-03	21	06	35	14	47	36	28	26	-08	-05	04	05	-09	57
30	21	04	10	09	14	12	30	24	29	18	31	02	15	18	05	18	20	25	30	21	32	05	06	13	10	07	05	28	20	19	20	03	-14	00	-07	19	58
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	31	13	19	09	07	11	30	11	19	19	17	-01	01	34	-02	04	27	25	09	16	25	05	10	19	14	42	03	17	30	23	21	04	03	23	05	05	60
		15	06	17	11	15	16	03	10	04	09	01	-10	30	00	08	14	15	05	04	19	14	22	24	09	40	20	23	22	06	12	-11	-04	00	06	-05	61
			18	14	16	40	27	11	24	08	10	10	04	01	05	07	25	19	10	31	30	16	20	04	34	00	19	19	06	17	23	-04	-05	-13	10	-17	62
				07	16	21	33	38	27	14	-02	18	07	-01	-13	00	28	11	17	23	09	22	14	11	33	17	23	-07	32	24	32	16	15	06	06	01	63
					-00	19	23	03	29	30	27	39	22	21	29	18	16	16	08	16	19	37	50	53	27	00	50	18	17	17	09	13	-01	01	-18	-11	64
						26	28	18	00	-01	00	06	06	22	-04	-02	12	30	07	31	06	04	02	-01	12	05	-02	09	06	24	28	-08	-07	-01	06	-09	65
							35	31	29	20	26	06	00	11	00	11	33	35	26	32	28	16	29	19	43	18	22	10	26	34	52	-06	-05	-02	-07	03	66
								20	28	48	41	31	28	34	02	24	37	35	29	47	33	25	15	21	42	12	21	27	34	51	46	-01	08	01	02	-05	67
									37	19	-06	-02	06	-02	-01	12	31	29	30	41	07	06	16	04	31	16	10	-01	41	43	32	02	-09	05	-06	10	68
										34	38	10	18	24	19	43	27	-00	37	29	38	09	14	21	31	09	27	12	26	26	12	16	-09	-08	04	05	69
											35	36	31	23	36	51	32	26	25	35	40	11	11	32	47	08	32	20	25	45	31	09	02	01	-16	11	70
												20	17	33	16	26	25	13	42	22	38	10	13	19	21	03	14	26	14	28	30	11	-06	-08	-01	00	71
													15	12	21	10	19	22	11	10	09	25	26	39	34	-18	37	04	11	18	23	12	15	22	-23	-11	72
														02	09	20	24	03	20	25	20	09	-01	19	10	00	14	13	08	17	07	07	04	-02	18	01	73
															-05	18	13	16	07	18	16	13	15	17	21	26	02	51	33	13	12	06	-08	11	-16	-07	74
																39	07	04	11	-02	32	00	-02	30	15	-05	30	08	03	-01	03	-01	-01	02	-11	07	75
																	06	11	11	16	28	00	07	30	21	07	10	08	10	14	10	04	-03	-17	02	-06	76
																		38	43	41	31	04	08	08	39	26	17	24	16	46	39	14	05	17	03	-05	77
																			20	31	17	15	13	17	34	14	06	24	31	58	40	-14	-05	13	-15	-08	78
																				29	39	03	-06	01	22	-01	15	12	20	30	33	15	04	12	02	07	79
																					36	16	18	00	39	11	07	29	32	53	34	02	-12	-01	-04	-05	80
																						11	04	16	37	03	20	16	15	23	35	01	-05	07	11	-06	81
																							40	39	26	03	33	06	26	14	01	09	-15	03	-09	-01	82
																								48	26	05	39	02	24	06	06	05	-06	-05	-26	01	83
																									24	03	34	06	30	13	08	08	02	06	-14	03	84
																										11	39	09	26	42	39	06	03	12	-14	-05	85
																											05	27	25	23	21	02	07	10	06	-07	86
																												08	13	10	05	01	02	-07	-24	11	87
																													31	15	02	-01	-06	-06	-13	00	88
																														39	30	-05	-01	03	-06	05	89
																															57	-05	08	18	-02	04	90
																																02	08	21	00	-03	91
																																	04	28	-09	-10	92
																																		19	-12	07	93
																																			-16	02	94
																																				-21	95

SECTION 1

Var.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	4
1	46	30	25	18	-01	10	16	-05	06	-04	16	16	00	12	10	12	10	09	05	33	12	05	12	09	12	17	19	22	11	-05	-06	14	-02	06	18	01	07	28	20	-04	17	05	2
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3			30	16	-07	-11	10	-10	15	11	-03	06	13	-11	-01	-02	15	05	00	16	00	-04	04	14	-08	-10	-04	13	-03	-06	-06	20	03	-06	03	09	08	08	13	-12	12	00	4
4				06	06	06	15	10	16	04	24	07	-13	11	05	08	07	15	-03	24	04	08	09	11	-02	07	03	08	21	03	04	13	08	12	00	16	04	19	24	10	29	13	1
5					-11	09	15	13	14	11	-03	21	-02	16	04	05	01	17	10	05	13	-10	14	31	18	22	21	20	18	02	24	00	06	04	08	11	31	-01	07	-10	03	11	0
6						-01	11	13	10	03	05	05	-08	01	08	13	04	03	-01	-06	07	00	04	14	-03	01	17	22	07	-04	03	01	-02	24	16	15	02	-05	06	-03	19	04	0
7							12	04	03	02	-01	18	-01	03	11	06	13	18	10	-02	22	16	23	15	26	11	20	-02	13	18	15	-07	04	24	07	23	14	-09	-01	30	17	14	0
8								21	16	24	34	22	04	15	35	44	40	14	16	16	18	10	24	48	26	28	34	21	31	21	24	08	-04	11	09	02	23	23	23	25	19	45	2
9									08	10	-01	13	00	09	-07	05	-02	-03	11	01	01	-04	11	18	03	03	16	14	20	18	04	13	10	05	-18	06	14	04	03	15	11	10	1
10										17	30	25	-04	04	11	03	09	14	17	21	04	-05	18	18	24	26	27	23	26	18	17	22	-11	17	12	-02	37	11	20	01	-02	07	1
11											10	16	17	06	10	19	13	20	12	03	06	20	01	16	26	17	23	26	15	08	19	09	02	15	-05	00	05	02	09	-03	10	08	0
12												30	-16	07	43	46	36	07	12	09	10	12	16	30	19	30	29	29	29	08	26	25	13	06	18	02	13	55	53	40	28	52	1
13													07	11	26	21	23	26	30	07	14	01	10	34	35	29	41	28	26	-01	11	23	04	20	03	15	43	30	33	12	22	19	1
14														14	-23	-08	-03	08	06	07	-06	17	-04	-05	10	-16	01	-09	02	-05	-25	05	-18	-01	-03	-02	03	01	09	-23	-11	-12	-1
15															-03	-08	-13	26	04	28	14	05	10	10	14	07	13	18	06	10	13	-05	05	11	11	05	24	15	25	-05	01	00	-1
16																69	61	18	05	-02	09	07	27	29	24	12	21	17	33	13	26	02	04	17	21	11	10	26	06	37	17	43	2
17																	65	10	08	-03	09	10	25	34	18	12	25	24	47	12	23	02	02	14	12	12	-03	28	15	38	24	54	2
18																		19	-03	04	04	-03	20	37	14	10	25	17	33	03	24	07	04	18	18	19	02	22	09	26	16	39	1
19																			19	25	11	-05	07	21	17	19	24	25	28	03	21	02	-06	22	07	16	22	12	12	04	16	07	0
20																				16	07	12	09	30	33	27	26	33	22	13	15	16	-09	09	14	-08	08	25	33	20	30	15	2
21																					21	02	09	13	22	20	17	12	07	03	19	11	-02	-03	09	05	07	09	19	-09	14	-00	1
22																						04	26	16	24	15	32	29	21	-05	13	05	02	-01	11	26	13	03	04	23	20	16	1
23																							06	15	07	-03	-04	-06	06	-01	08	03	00	07	-02	08	-09	12	21	07	-07	05	-01
24																								19	11	12	16	14	36	16	24	13	-09	06	00	-01	07	09	08	18	07	32	27
25																									28	25	41	33	33	12	32	15	06	33	13	19	39	27	24	31	27	39	27
26																										26	63	39	39	23	14	04	-03	16	21	08	27	12	16	30	16	23	29
27																											36	35	19	06	30	15	00	18	06	-10	21	12	14	13	16	20	12
28																												64	49	22	23	17	-02	22	32	06	38	15	20	30	19	26	26
29																													47	06	18	10	13	16	22	13	26	26	28	20	33	35	27
30																														19	18	01	-06	21	02	17	20	21	20	40	26	45	33
31																															03	03	-10	00	-03	03	05	-03	04	16	-07	08	18
32																																12	06	19	06	09	08	21	22	09	07	30	19
33																																	00	02	-04	-02	11	31	25	08	09	10	15
34																																		-04	-03	-01	04	06	-03	04	18	11	-01
35																																			09	16	28	03	09	19	21	11	11
36																																				-01	21	10	05	06	07	04	12
37																																					19	07	07	19	13	10	16
38																																						13	13	08	06	12	15
39																																							69	23	31	36	39
40																																								15	30	22	20
41																																									32	45	26
42																																										39	33
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Note: Decimal points omitted.

SECTION 2

Table 5

Image Correlation Matrix for Factor Problem II

9	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83
8	20	-04	17	05	21	10	16	10	18	20	14	06	-02	23	11	21	-02	08	12	00	17	01	03	15	11	22	24	03	09	17	05	-03	02	-01	16	-14	05	08	04	-04	15	14	02	23
4	10	-04	10	13	27	14	06	20	16	13	28	15	19	14	10	07	09	26	14	11	27	09	05	13	05	27	23	17	23	12	17	14	11	02	18	02	10	25	29	16	35	38	06	05
08	13	-12	12	00	09	-05	04	05	02	-02	17	07	21	01	09	11	08	23	02	19	20	10	08	24	20	25	29	22	11	17	15	19	07	-11	18	09	12	03	19	-06	24	21	09	12
9	24	10	29	13	18	-01	05	24	15	-04	17	06	23	10	13	01	01	16	-02	05	18	10	-02	22	11	-13	05	09	07	17	29	21	13	-02	06	06	23	07	02	06	11	17	05	13
1	07	-10	03	11	08	08	07	19	05	13	28	17	18	06	05	06	16	25	18	13	23	-07	19	15	-05	22	33	26	08	10	17	41	01	12	21	-07	11	15	25	34	27	29	12	-02
5	06	-03	19	04	06	-08	04	-01	-22	-10	-20	-08	08	-07	-12	-09	15	16	28	-01	19	08	-09	-01	10	01	-09	08	19	04	02	04	06	07	13	07	04	19	08	03	13	05	-04	04
9	-01	30	17	14	09	-05	-17	11	19	02	-05	24	-04	09	-07	02	-12	05	07	06	02	00	00	-01	-06	06	05	16	-07	-06	06	08	-08	04	10	-07	07	10	04	08	09	15	03	-02
3	23	25	19	45	24	21	13	32	25	24	15	13	16	-04	-12	-08	23	27	18	10	19	06	-14	06	17	-06	14	13	08	06	23	26	29	-01	23	08	00	32	21	27	10	18	04	13
4	03	15	11	10	16	14	21	10	07	04	04	06	09	01	04	-06	01	06	-01	10	-05	-04	17	-03	10	-12	11	13	-06	-09	14	20	07	07	-04	-11	02	24	12	00	10	13	10	14
1	20	01	-02	07	12	13	03	03	-06	04	19	34	22	18	13	23	15	24	29	19	28	18	01	15	14	07	17	41	13	26	20	28	08	-03	20	-03	15	21	20	30	18	29	08	-07
2	09	-03	10	08	02	23	10	04	01	11	12	03	12	02	-04	04	-01	06	09	06	12	-11	-06	34	07	-07	19	25	32	15	11	14	07	06	03	-20	-10	29	15	28	25	04	23	13
5	53	40	28	52	17	26	22	24	21	33	05	03	14	13	13	11	-07	00	06	-09	17	03	06	09	36	-10	05	10	05	15	16	12	26	-08	04	17	00	02	05	11	06	19	22	27
0	33	12	22	19	17	32	22	12	15	21	27	25	11	11	20	19	13	22	22	09	24	24	12	06	24	11	36	19	11	10	11	25	13	08	17	-05	01	14	25	19	28	11	20	18
1	09	-23	-11	-12	-13	05	12	00	03	-03	06	00	-09	07	10	07	10	-02	06	-03	-09	07	03	-12	19	07	15	04	04	02	12	09	-06	02	07	17	08	14	09	11	10	03	-07	07
5	25	-05	01	00	-14	-07	01	01	-10	06	10	03	14	19	05	14	01	02	07	08	10	05	-08	-16	07	13	14	05	04	10	-04	19	-11	21	09	03	09	14	05	14	09	00	06	13
6	06	37	17	43	21	11	10	33	10	27	-07	05	03	-04	00	01	06	11	14	02	13	-08	-15	24	04	06	-03	12	18	05	10	03	18	07	11	00	-02	17	12	10	04	03	02	-10
8	15	38	24	54	24	24	19	41	23	31	-07	-10	-06	-09	-06	-08	-03	10	02	-03	10	-11	-17	21	17	-06	-04	05	07	-15	09	-02	18	05	07	-12	-20	10	15	04	05	03	16	04
2	09	26	16	39	12	19	17	28	19	28	-06	07	00	-13	-03	-01	05	27	12	09	05	06	02	31	20	01	13	15	14	08	12	31	28	-04	08	-01	-10	20	18	16	07	10	19	09
2	12	04	16	07	06	-05	06	12	00	12	24	20	18	00	04	-09	24	22	11	04	17	11	00	25	21	20	31	27	23	09	20	16	19	14	21	-07	08	23	23	18	25	01	02	17
5	33	20	30	15	21	20	18	27	27	19	16	17	03	11	11	-06	13	01	-07	14	-01	05	14	01	14	08	25	10	21	13	21	00	09	10	-03	14	06	27	28	12	38	18	06	05
9	19	-09	14	-00	13	-04	02	05	06	14	19	20	07	19	04	14	25	11	06	22	17	15	-03	09	-01	15	20	20	18	18	09	10	01	01	05	-12	-04	07	01	14	20	03	-06	01
3	04	23	20	16	14	14	04	06	14	27	14	11	04	-02	-19	-01	15	12	03	24	15	17	06	15	-02	15	15	27	19	07	05	15	05	01	21	-17	00	10	06	02	23	09	06	09
2	21	07	-07	05	-01	05	00	05	01	04	15	19	-01	02	-01	-05	-04	-11	00	-04	-12	-04	-10	-13	-01	-09	03	02	00	-06	03	03	-03	07	-06	-03	02	18	14	08	-01	-10	-17	06
9	08	18	07	32	27	05	08	17	14	22	-04	08	05	15	07	01	09	08	01	10	03	09	-05	05	01	03	09	07	08	02	02	09	04	-06	23	-03	11	03	04	07	07	12	01	08
7	24	31	27	39	27	19	14	24	18	28	29	28	29	-02	02	-06	20	33	11	28	14	11	17	12	28	23	35	36	15	12	33	28	30	21	19	19	11	40	46	31	37	35	19	19
2	16	30	16	23	29	25	16	12	24	27	20	31	04	00	-09	20	10	23	23	19	29	13	11	08	-06	03	35	24	31	18	14	03	-09	03	11	-03	04	28	12	27	21	23	11	03
2	14	13	16	20	12	09	13	05	16	24	25	25	07	06	01	12	02	03	20	09	20	-01	03	12	09	11	21	08	27	09	11	10	15	-07	-06	00	-12	14	19	23	25	17	09	15
5	20	30	19	26	26	21	19	14	21	33	28	33	16	-10	-16	11	09	34	22	17	25	20	26	14	10	10	47	25	38	12	10	13	-01	-06	14	-14	-03	33	21	20	27	16	07	21
6	28	20	33	35	27	26	19	10	17	32	17	13	18	-01	-12	04	12	23	11	16	31	16	27	20	17	18	45	26	38	17	04	06	08	-12	12	-12	-04	28	35	14	27	12	19	29
1	20	40	26	45	33	31	25	30	22	32	20	14	11	-07	-06	00	20	30	11	01	13	14	05	08	09	02	24	21	23	-03	17	10	11	-09	22	-12	03	20	31	19	15	16	11	11
3	04	16	-07	08	18	02	12	22	11	08	17	19	18	-03	-03	-08	11	20	-04	06	05	-23	11	-13	-04	-07	03	12	04	06	05	02	-16	-10	15	04	04	07	-02	03	12	17	-11	-10
1	22	09	07	30	19	16	08	21	06	32	04	04	09	06	-12	-03	11	08	12	19	08	09	04	26	10	02	13	19	20	14	09	12	14	16	08	-07	03	26	10	33	21	18	11	04
1	25	08	09	10	15	14	14	-03	14	18	18	11	13	11	13	07	15	10	09	17	15	26	20	09	37	-01	20	14	01	22	08	11	11	-10	11	11	02	16	08	04	13	24	18	32
6	-03	04	18	11	-01	00	-13	-05	00	-10	-10	-06	02	-11	-05	-08	-04	-06	-04	08	05	00	12	-04	-11	-10	-05	06	-09	-09	00	-03	00	05	-04	-08	-16	-10	05	-04	01	-04	09	-03
3	09	19	21	11	11	-05	07	15	04	04	-04	07	00	06	04	12	07	20	18	23	21	03	03	11	14	-01	03	06	16	00	11	01	03	19	00	00	10	37	27	19	17	11	02	-05
0	05	06	07	04	12	-06	01	09	08	10	02	03	05	20	14	16	-13	04	23	08	02	05	02	12	02	11	02	08	20	21	14	01	07	14	00	11	03	18	-03	14	13	14	02	-05
7	07	19	13	10	16	10	12	12	03	16	13	14	22	14	14	12	19	24	25	04	18	10	07	13	12	11	17	26	20	11	24	13	-03	05	21	-02	17	18	36	12	14	12	03	08
3	13	08	06	12	15	04	01	07	06	-02	33	42	35	20	18	29	15	34	25	33	29	17	07	00	21	15	40	24	13	20	21	36	00	17	32	05	11	17	34	16	17	29	08	06
	69	23	31	36	39	34	51	34	35	48	17	03	17	18	21	06	-02	-09	04	-02	-01	03	-01	06	46	-04	13	-01	11	26	21	07	20	15	-01	25	24	01	12	06	08	13	26	42
		15	30	22	20	39	40	33	23	33	20	10	22	20	09	14	05	07	10	-04	09	15	04	-01	39	-02	22	04	05	26	16	18	14	07	09	19	25	00	17	22	14	23	17	35
			32	45	26	13	14	30	25	28	-03	-03	-09	-07	-04	-02	-01	08	-04	11	02	01	04	-10	14	-12	-04	05	01	-11	12	-05	11	04	02	00	01	04	10	-10	-03	15	04	13
				39	33	26	15	36	35	19	00	-03	10	-05	-07	-06	13	20	01	11	24	12	03	21	27	-02	01	13	06	03	19	09	19	11	02	07	08	02	18	-03	22	12	23	27
					35	28	22	32	41	40	-05	00	04	06	-06	-06	01	04	01	-04	09	05	-04	07	14	-01	09	03	03	-01	14	07	20	-07	09	09	-02	00	11	00	07	19	11	10
						34	32	35	41	35	17	-01	05	18	05	-06	18	15	01	09	19	21	13	15	18	-08	09	11	11	12	23	-04	09	04	21	00	20	13	13	-01	21	25	04	15
							53	28	40	48	09	00	11	13	08	00	06	02	14	-11	03	16	03	11	16	-06	13	07	06	05	13	-01	13	-04	04	-07	09	02	17	08	07	11	37	28
								33	34	47	14	00	03	06	14	08	00	-01	16	-17	-12	-06	06	-02	27	-07	22	01	21	21	27	12	06	12	-04	12	25	06	06	15	27	23	23	21
									31	36	04	03	09	-05	-02	-10	-03	01	-06	-06	-03	-09	01	19	05	-08	03	03	08	10	24	06	13	11	-04	11	27	08	12	07	10	19	-04	-04
										36	19	10	08	02	-09	-14	-13	02	-07	00	-02	03	-01	11	10	-12	08	-15	02	-05	11	-07	07	-04	-17	06	-05	-02	-05	03	01	15	09	13
											18	13	11	-02	-11	00	10	-05	-01	-11	01	12	13	17	19	07	22	13	17	19	20	-06	28	02	04	04	17	17	10	16	15	15	19	24
												51	44	01	-02	02	24	33	12	20	05	15	13	08	16	16	40	24	14	17	11	37	04	00	10	00	09	18	20	26	27	21	-13	19
													41	-07	-05	18	15	26	19	17	12	17	08	00	01	06	34	27	13	22	15	37	02	01	10	12	17	17	28	30	11	23	-16	-05
														07	14	-07	16	27	10	05	22	10	05	14	24	17	19	31	03	23	29	44	18	03	31	16	21	17	26	21	08	23	11	08
															66	29	-02	-09	11	-04	10	10	03	-05	11	09	-05	-02	02	15	13	04	01	-01	15	-08	15	01	16	-06	09	06	12	10
																36	-08	-11	-01	-05	02	-10	06	-05	20	06	-04	-02	00	04	22	-01	06	01	09	12	22	-03	22	-10	14	-07	16	05
																	-06	01	24	09	15	01	14	-03	13	03	19	-04	16	26	14	01	-08	03	09	11	23	-05	07	08	05	08	06	06
																		53	21	36	36	31	08	-01	10	16	16	32	21	12	18	17	15	08	50	06	08	24	34	17	24	15	-06	-02
																			41	44	46	38	15	09	21	18	23	33	18	19	11	30	02	09	40	04	14	26	32	16	21	34	04	-02
																				16	31	22	03	10	08	15	14	29	24	29	19	31	03	19	19	04	19	20	24	30	20	33	10	08
																					26	11	16	13	05	09	10	23	15	15	06	19	-11	21	20	02	07	22	19	12	30	29	-01	-01
																						33	12	19	10	07	13	30	11	19	21	17	-01	02	34	-01	04	27	24	08	16	25	07	11
																							15	04	16	11	14	17	03	10	05	10	02	-10	29	01	08	13	15	04	04	18	13	22
																								18	14	17	40	26	11	24	06	10	09	04	02	04	07	26	18	11	31	30	16	20
																									08	15	21	33	38	27	15	-01	19	06	-02	-12	-01	27	12	17	23	09	21	14
																										01	20	23	03	29	30	28	40	23	21	28	18	16	17	07	16	19	37	50
																											26	28	19	00	01	01	02	05	21	-05	-04	12	29	07	31	05	04	01
																												36	32	29	21	26	05	-01	10	01	11	32	35	25	31	28	16	29
																													20	29	48	42	34	28	34	01	25	37	35	28	48	33	26	15
																														37	20	05	-01	07	-02	00	11	30	28	29	41	07	07	17
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8								22	16	26	33	21	03	17	34	42	42	14	16	16	18	10	21	50	27	29	34	23	33	22	25	11	-03	13	07	02	22	23	22	25	25	38	13
9									10	09	-01	12	-01	09	-05	06	-02	-04	13	06	00	-03	13	16	02	03	16	13	18	17	01	12	09	05	-19	05	14	04	02	15	07	12	00
10										18	32	26	-01	04	10	03	09	14	18	21	04	-05	18	17	26	26	28	24	25	16	17	23	-09	17	12	02	38	11	20	01	14	04	00
11											10	16	16	06	11	20	12	17	13	02	07	19	02	16	27	17	22	25	15	08	17	07	01	13	-03	-01	06	02	10	-03	03	12	00
12												29	-16	06	44	46	36	09	11	08	10	13	17	30	18	30	30	29	29	09	26	26	14	08	17	01	12	56	52	40	42	45	21
13													04	12	26	21	24	26	29	08	14	02	10	35	36	29	40	28	26	-01	12	23	04	20	02	13	42	30	32	13	27	20	11
14														15	-21	-07	-02	09	05	06	-10	21	-02	-05	09	-14	01	-08	01	-06	-25	02	-17	01	-06	-03	01	01	06	-21	-14	-11	-06
15															-03	-08	-13	26	05	28	16	04	08	10	15	07	14	19	06	10	11	-04	05	09	13	06	25	15	26	-06	05	05	19
16																69	61	20	05	-01	09	07	28	28	25	11	22	17	31	10	26	04	07	17	19	15	10	27	06	39	32	62	11
17																	66	12	06	-02	08	12	25	34	17	12	25	25	47	12	25	03	04	16	10	13	-04	28	13	39	34	62	08
18																		18	-02	04	06	-04	20	37	15	09	25	17	32	03	22	07	03	16	20	20	03	22	10	26	28	44	15
19																			20	23	09	-04	09	20	15	18	24	25	28	03	21	-03	-07	22	07	13	22	12	12	05	29	06	09
20																				16	06	15	08	31	34	29	26	36	23	12	15	20	-07	10	11	-07	07	25	32	21	25	17	22
21																					21	01	09	14	20	20	16	11	09	06	18	08	-05	-04	12	01	08	09	21	-11	03	-06	21
22																						05	23	18	25	17	30	30	23	-03	15	04	02	00	10	23	12	02	04	23	14	11	17
23																							07	13	06	-04	-03	-08	05	-03	06	02	00	06	-01	11	-07	13	22	07	02	20	-08
24																								18	09	12	16	15	36	15	27	15	-08	08	-03	-01	05	09	07	18	19	29	05
25																									30	24	41	31	32	12	31	15	04	31	16	20	40	27	25	31	32	35	12
26																										27	63	40	41	26	13	05	-04	18	22	06	27	12	16	28	18	29	21
27																											37	34	18	05	28	14	00	18	08	-08	22	12	15	13	23	13	11
28																												65	50	22	23	15	-02	23	32	05	38	14	19	31	22	31	11
29																													45	05	16	11	11	14	23	15	28	26	28	20	39	32	26
30																														18	17	02	-06	18	03	17	[illegible]	21	21	41	34	40	10
31																															04	05	-11	-03	-03	03	25	-04	05	17	10	09	-03
32																																09	02	15	08	06	10	22	24	08	30	29	22
33																																	-06	-01	-02	-05	14	31	26	06	23	02	25
34																																		-02	-01	00	04	06	-03	06	15	13	04
35																																			11	21	29	03	10	21	23	16	10
36																																				-04	18	09	04	07	-01	06	12
37																																					18	07	05	21	20	15	16
38																																						12	11	08	21	15	08
39																																							68	23	42	35	53
40																																								15	42	25	35
41																																									32	49	14
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Note: Decimal points omitted.

SECTION 2

Table 6

Image Correlation Matrix for Factor Problem III

39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
27	21	-04	18	c3	20	02	01	-05	01	20	15	04	-01	23	10	21	-02	08	15	-01	19	02	02	14	11	23	25	03	09	17	04	-03	02	01	16	-15	07	07	04	-05	15	13	04
14	09	-03	15	08	00	04	03	05	03	14	27	15	18	14	08	09	10	26	11	10	25	10	05	13	05	27	23	17	22	13	16	15	12	01	18	02	10	26	29	15	36	38	06
09	14	-12	07	-01	01	03	07	02	03	17	17	07	21	02	11	09	08	24	05	19	22	09	05	25	20	25	29	23	12	18	17	18	07	-11	16	09	12	02	19	-05	24	21	11
19	26	08	19	02	10	23	11	20	11	21	17	06	22	12	12	01	01	16	01	05	20	11	-04	23	12	-14	06	09	10	15	29	21	13	02	06	08	23	05	03	04	09	18	05
-02	07	-12	21	11	05	01	03	-06	13	10	31	16	17	05	06	06	14	25	20	13	24	-07	19	15	-07	21	32	27	08	10	17	39	03	12	22	-06	12	18	24	34	27	27	11
-05	06	-03	10	03	05	07	-05	-05	08	08	-21	-08	06	-07	-12	-09	15	16	27	-01	18	08	-10	00	10	-02	-10	10	19	05	03	03	07	04	14	08	05	20	08	03	14	05	-05
-11	-01	28	13	16	-06	08	-02	-10	-07	07	-02	23	-06	06	-06	03	-14	05	09	07	04	01	00	-01	-06	04	04	18	-07	-06	05	07	-06	05	11	-06	10	13	04	08	08	14	01
23	22	25	25	38	13	19	09	28	25	29	17	13	17	-05	-13	-06	22	25	18	12	18	07	-12	05	18	-05	14	12	08	05	21	26	28	00	25	08	00	33	22	26	10	18	02
04	02	15	07	12	00	11	09	21	10	19	04	05	11	-01	05	-06	01	07	-01	08	-04	-04	16	-04	09	-10	12	12	-06	-08	15	21	07	08	-05	-14	03	24	11	00	10	13	13
11	20	01	14	04	00	-03	-02	04	08	13	17	35	22	18	12	23	15	24	27	19	28	18	00	16	15	06	17	42	13	26	19	29	08	-03	20	-03	15	20	22	30	19	30	08
02	10	-03	03	12	00	-04	-11	06	-03	-01	11	02	12	03	-05	04	00	07	10	05	13	-10	-07	34	09	-08	20	26	33	15	12	15	07	06	03	-20	-09	29	14	26	25	04	24
56	52	40	42	45	21	27	12	27	35	37	05	02	14	12	14	11	-06	00	06	-09	18	03	07	08	34	-08	05	08	04	15	16	13	25	-07	03	17	-01	02	05	12	05	19	23
30	32	13	27	20	11	17	-05	04	16	21	28	25	12	10	21	19	12	21	22	10	23	24	12	06	24	12	35	18	10	10	11	24	12	08	17	-06	01	16	25	19	29	10	19
01	06	-21	-14	-11	-06	-07	-03	04	-17	-11	07	-01	-09	05	11	09	09	-01	03	-05	-10	08	03	-13	18	09	14	04	02	04	11	09	-05	00	06	15	09	16	07	12	12	01	-06
15	26	-06	05	05	19	-07	-08	17	04	-11	10	02	15	20	04	14	01	02	08	08	10	06	-08	-17	07	12	15	04	05	09	-03	18	-11	22	10	04	10	13	04	14	08	00	07
27	06	39	32	62	11	24	20	25	33	36	-09	06	04	-04	01	01	07	10	13	02	13	-10	-16	25	04	07	-03	11	17	04	10	03	18	06	11	00	-03	16	13	11	05	04	03
28	13	39	34	62	08	32	24	26	43	44	-07	-10	-06	-09	-05	-08	-03	10	00	-03	09	-12	-16	21	16	-05	-05	04	06	-14	09	-02	18	03	07	-13	-21	11	15	05	06	04	16
22	10	26	28	44	15	24	18	16	31	34	-07	06	00	-12	-03	-02	05	28	13	09	05	07	02	31	20	00	14	16	16	07	12	11	28	-03	08	00	-10	19	19	15	06	10	19
12	12	05	29	06	09	13	09	03	07	11	25	20	17	00	04	-10	24	24	11	00	18	12	-02	25	21	20	31	28	23	11	22	16	22	13	20	-06	09	23	21	17	26	01	05
25	32	21	25	17	22	16	09	27	19	13	17	17	03	10	12	-04	13	-01	-08	15	-01	06	16	00	14	09	25	08	21	14	19	00	08	11	-01	14	05	27	29	12	40	17	05
09	21	-11	03	-06	21	03	09	19	03	02	19	19	05	21	02	14	25	11	08	21	17	17	-03	09	00	14	20	22	19	18	11	11	02	01	05	-10	-05	07	00	11	19	03	-07
02	04	23	14	11	17	10	02	13	09	15	15	11	03	-03	-20	01	13	12	02	26	14	19	08	15	01	15	14	28	19	08	04	14	05	00	22	-17	00	12	05	01	24	07	03
13	22	07	02	20	-08	03	-03	04	-06	-05	13	19	00	04	-01	-07	-03	-10	01	-05	-11	-05	-11	-13	-02	-08	05	01	01	-07	04	05	-04	09	-07	-03	01	16	14	08	-02	-08	-14
09	07	18	19	29	05	09	09	22	15	16	-04	08	03	13	10	02	09	08	-01	10	03	07	-06	06	-02	04	07	07	07	03	02	09	06	-08	23	-04	09	04	05	10	07	13	02
27	25	31	32	35	12	18	07	18	28	27	28	28	30	-01	01	-06	20	33	14	29	15	12	18	12	29	23	36	36	16	10	34	29	28	22	19	20	12	40	46	30	36	34	18
12	16	28	18	29	21	06	07	07	13	14	22	30	04	01	-11	21	11	22	25	18	29	14	12	05	-07	05	36	22	32	17	14	04	-11	05	11	-02	04	29	11	25	20	22	11
12	15	13	23	13	11	11	02	19	10	25	23	25	08	08	00	12	04	03	20	09	20	-01	03	12	10	12	22	07	28	08	12	11	14	-06	-06	00	-12	12	20	22	25	17	10
14	19	31	22	31	11	03	06	12	13	12	29	32	15	-11	-16	12	08	34	21	15	25	21	26	14	10	10	47	25	38	13	10	13	01	-07	14	-15	-03	34	20	20	27	16	07
26	28	20	39	32	26	12	05	18	28	26	17	12	20	-01	-12	03	12	24	13	15	33	16	27	19	16	18	47	26	39	16	04	07	08	-09	11	-11	-03	26	36	14	25	13	21
21	21	41	34	40	10	21	25	23	38	32	19	14	13	-06	-05	-01	21	30	13	03	13	14	04	09	10	02	24	21	24	-03	18	09	10	-09	22	-13	03	19	31	19	15	16	11
-04	05	17	10	09	-03	01	-02	11	06	03	17	21	20	-04	-02	-08	10	19	-03	10	05	-24	11	-11	00	-08	03	13	05	06	05	00	-16	-11	15	04	04	07	-01	03	13	17	-14
22	24	08	30	29	22	27	22	19	24	21	04	03	08	08	-11	-06	11	09	16	19	10	08	03	28	10	01	13	21	22	13	12	11	14	17	07	-06	02	26	10	33	19	19	12
31	26	06	23	02	25	12	05	10	08	18	21	09	12	10	11	08	14	10	12	15	19	29	19	08	40	-02	21	16	04	23	08	12	14	-07	11	13	03	17	09	01	13	23	17
06	-03	06	15	13	04	18	11	07	13	16	-13	-07	04	-08	-08	-08	00	-05	-04	03	04	01	12	-04	-11	-09	-02	05	-09	-08	02	00	-02	05	-05	-08	-15	-12	03	-07	02	-04	13
03	10	21	23	16	10	03	01	00	15	05	-08	07	02	08	05	11	09	21	19	22	21	02	01	12	14	-01	05	05	16	00	12	02	02	19	-01	-01	12	35	28	20	18	11	05
09	04	07	-01	06	12	-10	00	01	-04	-06	03	04	06	19	14	17	-14	02	22	11	00	05	04	13	04	12	01	07	19	21	13	00	05	12	02	09	02	21	-03	14	14	13	-02
07	05	21	20	15	16	06	07	-03	13	11	14	11	23	14	12	14	21	25	24	00	18	13	08	10	11	14	19	24	18	14	24	15	-03	04	20	-03	18	18	34	10	16	11	06
12	11	08	21	15	08	02	-08	05	07	11	36	42	34	18	18	30	14	34	25	34	29	18	08	-01	20	16	39	23	12	20	19	35	00	17	32	05	11	18	34	17	17	28	08
	68	23	42	35	53	55	35	40	46	48	17	03	16	16	22	06	-03	-09	03	-02	[illegible]	02	-02	07	47	-05	12	01	10	28	21	07	22	14	-01	25	24	02	12	06	09	13	25
		15	42	25	35	35	12	35	38	32	21	11	22	19	09	15	03	07	10	-02	07	15	05	-01	39	-02	21	04	04	27	16	16	14	06	10	19	25	02	16	22	14	21	14
			32	49	14	26	21	31	35	41	-05	-04	-11	-06	-05	-02	00	09	-05	09	02	01	04	-10	13	-12	-04	05	01	-11	13	-04	10	04	02	01	01	03	09	-10	-04	16	05
				51	51	52	46	41	63	66	06	15	12	01	-09	-10	17	17	12	-01	21	14	08	06	28	-02	25	19	06	20	23	14	25	13	13	13	23	05	22	05	19	34	16
					20	41	39	47	54	56	-03	05	01	-09	-13	-03	01	05	01	05	09	-06	-08	03	06	-04	12	04	10	-10	13	-03	11	10	04	02	-01	07	14	07	00	12	00
						47	35	38	52	38	-02	-01	06	14	02	03	12	06	13	11	16	19	06	08	31	03	08	06	22	36	13	00	11	22	06	16	15	12	01	06	14	10	17
							56	50	61	65	03	-05	06	-01	-04	-18	05	-07	-05	-01	-01	-02	-06	05	32	-15	-05	12	-01	01	22	05	35	24	-04	12	11	-08	05	-03	10	10	17
								42	54	53	01	07	03	-13	-17	-23	02	02	08	-07	-01	07	-14	-02	10	-08	-02	03	02	-01	12	05	13	06	-06	06	15	-09	01	-09	01	09	-06
									54	52	11	14	19	-08	-08	-11	12	-02	-10	09	-04	13	-02	04	12	-07	01	09	15	09	22	03	19	23	00	18	12	03	10	08	17	26	-03
										71	02	04	06	-14	-12	-10	18	18	09	10	13	04	-04	02	14	00	-03	06	00	00	10	05	15	22	07	13	05	-02	11	03	15	15	09
											07	09	08	-12	-10	-09	11	13	08	06	12	02	02	15	26	06	08	15	04	05	11	07	26	15	06	08	03	-12	12	-06	08	27	14
												50	44	01	-02	01	23	32	15	21	07	15	12	08	17	15	40	25	17	15	11	37	04	04	10	02	08	16	22	26	25	23	-13
													40	-06	-06	18	16	26	20	16	12	17	08	-01	00	06	34	27	13	22	17	38	02	01	10	13	17	18	27	29	11	22	-15
														07	12	-05	16	28	08	04	21	12	05	14	24	15	19	31	02	24	28	45	19	02	32	17	21	17	26	19	09	22	10
															66	30	-03	-09	09	-03	08	11	04	-04	12	08	-05	-03	00	16	13	02	01	-05	16	-10	17	04	15	-05	11	04	10
																35	-08	-11	00	-07	03	-10	06	-04	21	06	-05	-01	01	04	23	00	08	01	08	13	20	-04	22	-10	13	-05	17
																	-05	01	25	09	16	02	15	-04	13	04	20	-04	17	24	13	02	-10	05	09	11	23	-07	08	06	04	08	06
																		53	18	36	34	31	09	-01	10	15	17	32	19	13	17	17	14	06	51	05	10	25	34	18	26	14	-06
																			41	44	46	37	15	09	21	19	23	32	17	18	11	31	01	08	40	03	13	25	31	17	21	34	05
																				19	30	22	03	11	09	13	12	30	24	29	17	29	05	17	20	05	18	23	25	30	20	32	06
																					27	13	16	13	06	08	10	25	16	14	07	19	-10	23	20	04	08	22	18	09	29	28	-01
																						32	12	19	10	07	12	30	11	20	19	16	01	02	34	-01	03	28	25	09	16	25	06
																							15	04	17	11	15	16	04	09	03	10	00	-09	30	01	09	13	16	05	04	19	12
																								18	15	16	41	26	11	24	07	10	10	04	02	04	08	26	18	10	32	29	16
																									06	15	21	33	38	26	16	-02	18	06	-02	-12	-01	28	10	17	22	09	21
																										01	20	22	03	27	29	28	38	25	22	29	19	17	16	07	14	18	36
																											26	29	18	01	-01	00	05	05	21	-04	-02	11	31	08	32	05	05
																												35	31	29	20	26	05	-02	10	00	11	32	35	25	32	28	16
																													20	28	48	41	33	29	34	01	23	38	35	29	47	34	26
																														37	18	-06	-01	08	-02	-01	12	32	29	30	41	07	05
																															34	39	10	19	22	20	42	25	00	38	29	37	10
																																35	37	30	23	35	51	33	25	27	36	41	13
																																	19	16	34	14	27	24	14	43	23	39	11
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III

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14	25	11	-08	21	17	17	-03	09	00	14	20	22	[illegible]	18	11	11	02	01	05	-10	-05	07	00	11	19	03	-07	01	-03	06	17	03	10	17	17	13	-01	07	02	-06	01	21
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																35	37	30	23	35	51	33	25	27	36	41	13	12	32	47	07	33	20	24	44	30	07	00	01	-17	11	70
																	19	16	34	14	27	24	14	43	23	39	11	12	19	20	03	15	26	14	26	30	09	-06	-06	00	-02	71
																		15	10	24	09	18	22	11	09	09	24	26	39	35	-16	35	05	12	20	24	13	17	21	-24	-12	72
																			02	10	20	23	04	18	25	19	07	-01	18	11	01	11	13	08	19	08	09	06	-03	18	01	73
																				-04	18	12	16	06	17	16	10	15	17	21	26	01	51	33	13	11	07	-07	10	-16	-06	74
																					40	09	04	11	-03	33	02	00	29	15	-05	30	06	02	00	03	-01	-03	02	-10	07	75
																						06	10	08	16	27	-02	07	30	20	06	10	08	11	14	10	05	-02	-18	03	-04	76
																							39	45	41	31	01	08	08	40	26	17	25	15	45	38	15	05	17	03	-05	77
																								20	31	17	15	13	17	34	15	06	24	31	59	40	-13	-04	13	-14	-07	78
																									28	40	04	-07	02	23	00	13	13	21	32	36	14	06	11	00	06	79
																										36	16	17	01	38	10	07	30	33	53	34	01	-11	00	-04	-05	80
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																													47	27	05	39	02	24	06	05	06	-06	-05	-26	01	83
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																															12	40	08	26	43	39	06	02	11	-14	-07	85
																																05	27	25	22	21	-00	07	11	05	-09	86
																																	09	14	10	03	02	03	-08	025	12	87
																																		31	15	03	-02	-06	-05	-13	-02	88
																																			38	31	-06	-01	04	-06	04	89
																																				56	-06	07	18	-01	03	90
																																					01	08	22	00	-05	91
																																						03	29	-07	-12	92
																																							21	-10	06	93
																																								-16	04	94
																																									-20	95
																																										96

Table 7

Unrotated Factor Matrix for Problem I

	Factor																														
Var.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	h^2
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2	-45	13	05	-21	-19	08	01	14	-37	-22	-03	-09	-15	-31	11	08	03	-13	-20	-11	15	02	10	-19	04	03	-02	-06	05	-02	81
3	-25	23	-23	-05	-17	09	-28	18	-39	-14	16	01	05	-22	-01	-02	-07	-10	02	-27	00	-16	-06	03	-02	-09	-01	-06	-03	14	71
4	-29	-12	-23	-01	01	-14	01	-02	-35	04	-05	03	20	07	06	16	-32	05	-09	-34	10	-05	-07	08	16	-01	-15	-05	-12	-07	70
5	-38	27	09	-18	03	04	02	20	-17	-19	-25	-12	-01	-08	16	-06	12	09	-12	17	-05	15	-01	09	27	20	03	-14	-07	10	72
6	-13	-03	10	32	03	04	00	-17	-02	28	-12	-07	-18	-09	04	35	-25	00	06	16	29	-14	27	-04	-17	-03	00	-04	-02	11	74
7	-18	-02	29	-01	09	-12	22	-14	01	-23	-19	21	00	26	18	-18	-08	-27	14	-15	17	11	02	-05	21	-18	16	15	04	01	77
8	-49	-29	19	21	06	-20	02	09	02	-04	-01	-39	-02	-13	-02	-13	-12	-09	-18	-05	14	-01	01	09	11	07	02	-08	14	-11	79
9	-17	-07	-01	-03	22	-05	-01	-02	33	-24	-30	-10	21	-11	18	20	-29	08	-10	-03	01	14	16	12	-26	21	-22	-06	-12	-09	82
10	-45	16	03	09	-16	-08	25	15	-02	10	-14	00	37	-09	-11	15	05	-04	05	07	05	02	-17	-06	-20	-31	-08	-07	-10	09	77
11	-32	-03	11	-09	07	30	03	-13	10	10	11	-43	35	00	21	01	-03	00	02	-03	06	-14	-04	-17	06	-16	06	-10	04	04	72
12	-43	-57	-12	18	-27	-05	14	21	07	09	-07	03	06	-04	-05	-02	-03	12	07	01	-01	-05	-16	-05	-03	-06	00	18	05	09	82
13	-52	-05	04	-03	-32	-08	05	03	16	-12	-03	-10	-05	05	16	04	28	02	03	-07	03	11	03	-09	-11	-12	08	02	-35	-13	76
14	-03	22	-22	-07	04	01	02	-18	17	-12	38	-33	-14	-22	10	-10	-01	-36	06	04	00	08	-24	-04	-07	-04	-10	01	02	-02	74
15	-20	05	-06	-15	-15	-20	24	-18	00	06	-20	-36	-26	26	04	03	-10	-01	-16	09	-25	-03	-11	04	00	10	-23	11	17	17	78
16	-35	-45	37	30	-07	11	13	13	-28	-04	13	07	00	-03	-01	-10	11	03	08	04	-14	-04	05	-07	-05	04	-09	08	-14	08	81
17	-33	-61	33	25	-04	09	-08	01	-14	-12	13	-10	03	-18	10	-10	02	01	06	-02	-13	07	03	00	-04	-01	-11	-04	-02	07	83
18	-40	-37	23	37	-04	19	-16	13	-14	-07	21	00	02	-07	08	-18	11	-14	10	-06	-09	04	-04	23	03	-09	-12	06	00	-14	83
19	-42	06	11	00	02	07	03	-13	-05	-05	13	-19	-06	37	-20	16	-05	-05	-12	02	-23	10	-04	09	22	-18	08	09	-23	02	72
20	-40	-06	00	-33	10	05	17	-18	31	-09	-05	07	-10	-19	-38	01	08	00	-03	-06	-01	-13	-04	-19	02	-15	07	-07	-14	-05	78
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23	-06	-13	00	-09	15	-13	20	-09	11	-10	23	-24	-08	08	-01	-12	-08	00	50	-26	22	-04	-01	-17	-01	09	-02	-09	04	31	80
24	-26	-16	19	04	-08	-18	00	-05	-07	-18	-19	05	22	02	-20	022	-09	-30	08	17	09	-14	-01	13	03	14	-23	-11	-18	22	73
25	-67	-09	09	16	13	02	02	10	12	-24	-11	-06	-20	-03	-06	-06	08	03	02	-13	02	-11	14	04	05	10	-02	-09	13	02	75
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27	-40	-11	17	-14	-18	11	22	12	20	08	-08	-04	12	06	-19	05	12	15	-28	02	37	08	01	14	12	-05	17	04	08	05	77
28	-61	-04	36	-15	-23	-02	-02	10	35	15	00	06	-06	-03	12	06	-17	-11	-01	06	-08	-01	07	01	02	-03	01	-12	04	-09	84
29	-56	-08	20	-20	-28	15	-15	01	18	11	-13	01	-13	-05	01	26	-21	02	07	11	-16	-22	-11	05	00	-03	06	-13	07	08	85
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31	-16	-03	20	-09	18	-31	15	07	12	-10	02	07	22	-27	09	-14	-22	02	-17	09	-25	-20	15	08	01	-26	06	19	12	19	79
32	-40	-21	14	-03	18	08	01	-09	-05	19	-35	-07	14	13	-15	-20	27	12	17	19	04	-01	00	18	16	06	-07	-01	08	04	76
33	-31	-06	-33	03	-16	-07	-18	10	25	11	-07	05	23	-13	-20	-05	03	-03	13	-14	16	04	14	-07	-02	04	-04	21	-10	01	62
34	02	-09	02	03	-04	11	-17	14	03	-02	-30	03	-15	02	24	-13	-06	49	03	-22	-03	-04	-34	-15	06	06	-02	-05	-04	12	71
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36	-21	-01	06	09	-25	16	31	10	-08	25	-02	10	-28	-03	-10	-17	-17	00	08	02	-15	-02	16	-15	05	-14	-14	-18	21	-24	72
37	-32	12	05	14	06	-08	-05	-25	-22	-15	17	21	-08	17	32	05	-12	21	31	03	00	-06	02	23	-07	05	-01	21	11	-13	79
38	-49	30	04	09	-25	-18	21	08	10	-12	-17	-03	-04	10	21	12	22	06	-11	-08	-08	-12	07	-01	-06	04	-01	-02	02	-15	74
39	-44	-54	-44	-14	-11	-11	08	-05	-03	05	04	-01	-09	-03	-03	03	18	09	08	-04	-12	-11	04	-05	-05	09	-02	09	-06	04	84
40	-46	-34	-39	-19	-08	-26	08	-05	03	11	-01	-10	-07	-04	-01	08	12	03	18	02	-01	-07	-11	01	-03	-05	04	08	00	14	74
41	-27	-46	24	17	05	-16	03	-09	20	-17	-05	38	-15	05	04	-05	-13	-03	-06	-15	-03	00	-03	-05	00	-04	-03	17	-06	-05	74
42	-35	-21	-04	-11	38	-01	19	-45	-03	08	-03	-02	00	06	-14	10	-12	04	-21	-07	03	12	01	11	09	-09	04	13	07	-06	73
43	-22	-37	-24	-37	31	-09	-08	-24	-18	04	-04	06	-04	-08	11	13	04	-03	08	02	-12	01	-17	19	03	-11	06	-12	04	01	75
44	-28	-17	-18	-21	25	-11	-33	-05	-11	-05	18	11	20	-23	26	-02	14	04	04	16	09	11	-06	00	-09	03	03	-04	22	02	72
45	-29	-46	-07	-26	12	-11	-03	-23	01	07	13	02	21	-15	13	-06	27	07	-16	09	04	08	25	-11	00	13	06	00	-02	01	78
46	-43	-35	-16	-23	08	-15	-10	-04	-12	-01	-15	-07	-03	-07	12	09	-02	-01	-14	04	10	00	-05	10	-27	-07	-03	-06	04	-19	66
47	-45	-29	09	-40	06	-07	-09	11	-23	-08	-12	11	-21	21	00	-01	20	-05	00	17	15	-08	14	-12	-09	03	-12	03	00	01	81
48	-25	-23	-08	-43	10	-07	-20	00	-15	03	01	-14	-16	-02	-01	-12	-08	05	12	-11	-10	-02	03	-08	16	-11	-04	13	-08	-19	60
49	-32	-16	01	-13	04	-39	00	13	-17	25	-07	13	-26	-13	-13	07	-09	23	18	05	-03	17	02	08	06	-18	14	-26	-09	04	80
50	-44	26	-05	-31	03	-29	-02	30	11	-06	25	-15	04	12	-06	-03	06	15	-01	-15	-05	-01	24	03	04	01	00	03	-03	-09	77
51	-40	29	14	-13	09	-29	25	36	10	-05	20	08	14	21	-03	07	12	-04	13	-16	04	-05	-03	04	-11	02	11	-05	06	01	79
52	-41	19	-19	04	12	-20	01	30	-12	-11	02	-11	18	19	-02	23	-04	21	04	06	-14	-25	18	-13	08	-04	-04	00	22	-06	79
53	-12	09	-29	-03	-40	-05	35	-34	-15	-24	-17	-01	18	-05	-15	-07	-07	15	18	10	04	10	03	-04	08	-05	-12	04	14	-15	82
54	-06	09	-39	14	-36	09	42	-24	-03	-44	07	09	19	-09	-10	-02	03	20	-01	03	-10	-01	06	00	03	-04	-14	-01	-04	-08	90
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56	-38	33	10	21	16	-25	-31	-19	-02	05	11	-09	-05	-12	-31	-03	05	18	-08	10	04	-03	-12	04	-06	11	08	08	-15	02	79
57	-50	38	17	27	02	-28	-29	-02	-07	08	02	04	-03	-14	03	08	07	-03	-04	-07	-09	02	15	16	04	-16	-10	-04	02	08	81
58	-37	27	04	25	-10	-06	14	02	-07	33	04	-02	-14	-01	18	02	01	11	13	17	27	27	15	09	01	-12	-06	06	-08	10	74
59	-32	36	14	15	01	-08	-12	-12	08	12	-20	07	-04	-11	-04	-33	16	02	-15	-37	-05	-22	02	09	-18	01	-12	-06	-02	07	80
60	-42	25	13	24	-23	-11	-15	-10	-13	21	-10	07	17	-09	-01	25	-03	09	-11	-13	-02	16	-12	-17	10	09	13	08	18	21	80
61	-29	21	-08	06	-20	-26	-40	-10	05	16	-05	11	-07	11	-12	10	09	-15	24	00	13	18	-12	-15	05	-03	-25	-04	04	-19	78
62	-26	24	-16	-13	00	23	-15	14	33	-05	-20	32	-05	-17	02	-08	-14	02	19	02	-20	15	-01	20	01	06	15	08	03	-04	75
63	-34	-03	05	-05	02	51	-20	02	-26	21	07	08	34	14	-06	-04	02	-02	04	-11	-11	03	17	04	08	-02	-03	-13	01	-04	78
64	-43	-16	-55	25	-03	02	-11	-06	17	-06	03	-10	-01	04	-02	04	07	-14	00	-04	-11	01	13	09	-14	-14	08	09	08	01	76
65	-23	31	09	-15	-19	20	-11	08	-21	-24	02	-02	-31	06	-24	-06	07	-01	06	20	-05	07	21	-01	-13	-02	02	08	08	13	68
66	-56	23	-04	-31	-12	16	-09	18	22	-05	13	-01	-06	07	06	05	-06	-13	04	-03	-12	03	-10	22	10	16	04	02	-10	05	77
67	-59	30	-02	11	25	18	-10	07	-05	-06	-03	05	10	17	00	-10	-19	07	04	09	-04	12	-09	-16	-18	-20	03	02	01	17	82
68	-43	11	15	-18	-07	38	06	-18	-01	30	27	07	00	01	-02	-01	-07	06	-05	12	11	-32	08	14	-02	06	-10	00	-07	01	79
69	-42	21	-35	01	01	08	18	06	-11	43	02	07	13	-01	03	-19	-09	-09	04	09	-12	-15	02	01	-02	06	08	18	-05	-06	76
70	-51	05	-34	19	33	08	19	-04	-12	-06	12	15	03	-02	03	00	-20	09	-14	02	05	07	-14	-13	06	07	06	-14	-07	-13	79
71	-44	30	-19	18	19	-16	10	35	-03	-04	-14	-28	10	16	19	-05	-06	-03	02	03	02	02	-07	00	-01	06	-07	11	-12	-08	77
72	-32	-21	-26	33	16	26	-07	20	-04	-19	-01	-08	-06	17	-32	07	-05	-02	-08	07	12	11	-08	00	-06	-11	18	-19	03	-10	78
73	-20	09	-15	11	36	15	24	-20	-06	11	-18	-05	-27	17	08	-15	16	07	-07	-16	-27	24	14	-09	-22	03	-02	-14	-08	15	82
74	-38	27	-01	32	-12	-31	-23	-13	-16	-14	-04	-11	07	-02	03	-20	-10	-05	-01	31	-09	-05	00	-22	03	06	22	07	-05	00	83
75	-12	-02	-45	26	24	-11	22	17	05	08	12	22	-25	-12	-17	08	14	-15	-16	01	06	-25	-08	-02	12	09	00	-02	15	02	79
76	-26	17	-43	07	20	-16	27	-10	-20	02	00	28	-05	04	06	03	-09	-19	04	15	-04	-16	01	04	08	13	06	-15	-22	10	77
77	-53	20	14	12	24	29	13	-11	15	07	00	-17	-01	-16	-11	10	-13	-13	18	-12	-06	10	09	-08	07	17	-08	04	15	-05	80
78	-53	19	06	07	01	14	-01	-12	06	-38	16	01	-16	-08	-08	27	12	24	15	01	13	-06	-08	11	06	01	-04	-05	10	11	80
79	-45	15	07	-02	28	11	25	20	00	25	01	-24	01	-02	09	-11	17	-04	10	17	07	07	-15	09	08	03	-11	11	04	-08	71
80	-54	26	-01	-16	09	30	04	-16	00	-06	-04	-03	-07	-17	-04	-21	-09	12	-07	03	07	-02	12	-06	-14	-06	08	11	-16	04	72
81	-51	17	-16	-00	23	-07	10	22	-07	10	-25	21	-07	-31	08	-05	03	-16	-06	-05	11	10	00	-03	09	-05	-12	21	07	-01	79
82	-28	-15	-29	10	-16	30	-25	-11	13	-09	-15	00	10	12	25	-07	14	03	-12	11	-05	07	-03	-09	04	-16	-08	-04	13	07	66
83	-34	-20	-42	-06	-25	10	-32	-08	26	-03	05	-09	-01	25	14	-04	-15	-12	-01	-03	08	03	15	08	05	09	08	11	04	15	80
84	-38	-13	-43	26	-10	-02	-12	-04	04	-02	04	05	-13	29	04	13	07	-31	-21	00	-03	02	02	-08	03	-05	-04	-15	04	12	76
85	-61	-06	-15	-01	06	34	-01	06	16	-10	-16	19	03	-04	-08	-06	-14	06	01	07	08	-04	-09	-21	16	18	-03	04	-06	01	78
86	-31	19	16	-04	-11	-19	-21	-33	03	16	04	08	24	02	-16	21	14	-01	10	-04	-20	01	05	-22	17	26	-01	-08	00	-08	75
87	-35	-23	-46	16	06	11	-24	16	24	20	09	06	01	-01	-11	-14	-01	10	01	-04	-01	12	05	06	00	05	-16	-09	02	03	73
88	-33	36	01	24	12	-32	-20	-24	20	-06	08	-16	-08	-15	-04	-29	-02	10	08	05	-05	04	03	00	05	-03	14	-14	01	-13	79
89	-57	14	09	05	-03	-01	-20	-28	-05	07	09	14	07	27	12	-22	17	04	-18	-15	19	-25	-05	07	06	-07	06	-02	00	-06	85
90	-64	17	10	-09	14	24	09	-09	-09	-20	28	10	05	-02	05	10	03	12	00	-01	-01	01	-10	-10	-19	02	-02	09	09	-02	79
91	-61	17	21	-16	08	20	03	19	-08	-08	08	11	-03	05	-07	19	05	-13	04	01	00	03	-13	03	-08	03	04	01	-06	-05	69
92	-16	-30	-01	14	-03	08	12	04	-13	22	-26	-30	12	-03	09	07	-01	-10	25	-07	-14	-16	01	-08	-16	13	36	-06	-08	-15	74
93	-12	-33	25	-01	25	-20	14	13	01	-13	11	21	30	24	-26	01	-05	-06	04	-06	-12	21	12	-03	-13	11	06	-15	15	11	78
94	-23	-36	38	31	00	07	-04	00	-14	01	-05	-05	-10	-12	-10	16	15	-09	-11	-02	-10	03	-21	-05	-07	21	13	27	06	-04	75
95	25	46	-01	-25	25	12	-05	-11	-11	10	-26	10	10	02	05	19	19	-19	04	-12	-09	04	02	-14	-09	-06	-13	13	00	06	75
96	01	-11	04	07	-02	-08	07	12	07	30	52	06	-12	13	16	02	-15	24	-20	-02	01	14	05	-16	01	10	-12	11	-14	03	70

Note: Decimal points omitted.

Table 8

Unrotated Factor Matrix for Problem II

	Factor																														
Var.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	h^2
1	-28	-04	-09	31	-22	02	33	-19	-26	-10	-10	07	06	16	21	-09	-07	-09	18	16	-04	-25	-12	-09	-02	-05	-19	-03	-09	-11	78
2	-44	14	06	17	00	-02	22	-30	-25	09	-13	03	30	24	12	02	-02	03	10	-08	16	-08	01	01	09	03	-24	07	03	08	76
3	-24	24	-19	-01	-13	15	08	-29	-42	-07	-26	-04	13	12	07	05	-25	08	10	07	-06	13	00	11	-15	-01	01	09	01	05	72
4	-28	-05	-19	-09	-08	-11	10	-22	-31	-22	06	06	-24	26	-10	23	-28	-19	09	04	-01	07	-17	00	12	01	13	-03	02	-04	72
5	-38	26	12	12	12	-06	03	-17	-21	21	10	16	21	14	-11	-25	10	00	-18	-06	-05	04	-12	02	24	05	-11	00	-11	-10	71
6	-13	01	09	-32	-04	12	15	09	26	-15	11	05	16	13	06	26	08	-40	11	15	15	08	08	-29	-11	11	-03	07	-06	04	74
7	-18	-03	31	-01	03	-23	05	-18	10	16	22	-12	-33	12	-09	-24	-02	12	31	13	12	01	-06	-03	-03	12	00	-32	-05	04	77
8	-51	-28	17	-23	02	-18	01	17	-10	11	-05	23	14	07	16	-03	-16	-01	09	-12	13	-03	00	-12	20	-12	-03	04	06	-11	76
9	-18	-05	00	02	05	-10	-31	-04	11	29	25	12	11	02	-23	16	-15	-29	10	01	-19	-22	-21	-16	02	-13	12	25	06	-01	77
10	-43	19	03	02	02	-16	22	13	-18	-04	22	02	08	-30	-16	25	03	02	08	-13	13	04	-07	07	-29	11	08	13	05	-07	76
11	-31	01	11	14	16	25	05	16	10	05	-04	41	-03	00	-30	10	-32	09	16	-18	12	05	14	13	01	-03	-10	-01	01	04	76
12	-45	-54	-19	-06	-06	-05	21	25	-16	04	16	-09	01	-08	02	08	-06	-07	-13	08	06	04	01	15	-13	03	00	-13	07	-03	83
13	-53	-03	-01	15	-18	-07	12	13	06	23	00	-03	06	11	-13	06	09	23	-02	-02	-03	-11	-07	-03	-15	08	05	-04	-37	05	71
14	-03	22	-20	13	07	-11	-05	08	27	14	-37	15	14	08	20	-06	-12	13	34	-06	10	02	-11	21	-01	00	22	-02	04	04	72
15	-17	13	-05	12	-08	-17	25	26	12	14	12	29	-20	31	18	-11	16	-26	-06	-10	-21	03	-08	23	09	00	-03	05	28	09	85
16	-38	-46	31	-24	17	01	33	00	-10	-04	-14	-09	02	-12	-03	-03	00	05	-07	04	-11	-04	04	10	-09	12	-07	08	-13	13	80
17	-37	-62	27	-23	05	08	15	-01	-02	08	-19	07	13	-03	-03	-02	-13	04	02	01	-11	-09	00	07	-03	13	-04	07	00	-01	82
18	-43	-38	18	-29	09	19	15	06	-12	02	-25	-09	10	-07	-04	-11	-11	24	10	08	-20	05	-08	00	-01	11	20	-00	08	-07	83
19	-41	11	12	-02	02	07	07	07	-02	06	-19	13	-34	09	09	10	20	-11	02	-20	-21	00	-09	01	06	16	18	-28	-23	09	75
20	-40	-06	-01	41	10	-07	-19	-16	33	11	13	-03	-07	-06	45	33	-01	10	-05	-19	15	04	11	06	-15	10	05	-03	-11	-04	72
21	-26	14	06	21	-19	-06	14	06	-18	-19	-03	23	-28	-05	33	01	-13	-08	-17	-04	-03	-18	-25	02	-09	-07	25	04	17	-15	79
22	-34	02	26	07	-21	09	-08	-06	00	-06	04	05	-27	07	03	-41	05	-13	01	10	22	02	06	-11	-21	-19	08	17	13	12	74
23	-06	-09	00	07	14	-23	-05	16	14	13	-16	20	-29	04	10	12	-25	09	14	49	22	01	08	14	-01	07	-23	11	-08	-04	81
24	-28	-19	18	-04	-13	-23	03	-15	-09	07	11	16	-09	-31	07	-21	-01	-07	20	-01	-03	27	-19	-10	-02	09	00	23	-03	18	71
25	-68	-07	09	-17	13	-04	-11	-01	-01	29	05	-04	01	10	18	02	-02	10	-06	09	-06	03	10	-06	11	01	-08	10	04	00	73
26	-51	-01	32	32	-03	-13	-01	21	20	-14	04	-21	-02	00	-04	-12	-06	04	08	-18	12	-14	00	23	08	10	-07	02	00	-01	80
27	-40	-08	14	27	05	07	11	23	-12	10	22	-07	-08	-05	09	11	-01	05	-20	-20	19	05	-18	-37	06	-07	-15	-17	-01	-02	79
28	-62	-05	33	29	-11	06	-05	29	07	01	12	-18	10	03	02	-03	02	-18	17	-02	-06	-03	14	-02	05	05	12	05	-05	-06	85
29	-58	-08	17	27	-21	29	-02	10	02	03	13	-05	12	10	02	10	10	-28	02	02	00	16	20	08	-02	-04	06	06	02	-11	81
30	-55	-25	31	03	-10	-11	-11	-00	09	05	-15	-01	04	-04	-13	07	06	-19	10	-07	-03	12	-15	10	02	10	10	09	00	-07	69
31	-16	-04	22	06	10	-38	-18	-02	-03	00	04	-04	10	-18	-05	01	-28	-27	05	-24	-24	05	17	03	-13	09	-19	-27	16	00	77
32	-39	-14	15	-05	12	11	01	05	00	-05	32	31	-16	-23	05	-09	10	14	-25	12	-11	21	-11	-02	17	13	-04	-02	00	02	74
33	-31	-01	-33	03	-22	04	-16	14	-13	-03	19	-01	06	-24	09	14	-21	14	07	15	-07	-04	-10	-05	-10	02	-02	-05	-05	30	65
34	01	-08	03	-09	-08	20	-03	-01	-09	16	28	-08	-03	28	-10	-04	-23	-06	-41	20	11	-06	02	29	04	-06	08	03	-13	-01	67
35	-32	02	21	-13	08	-02	23	-08	35	00	18	-02	-06	17	-01	30	03	19	13	09	-18	09	-07	-13	02	-08	01	-11	-02	-03	65
36	-22	-03	02	06	14	02	41	03	06	-15	12	-21	06	01	26	-17	03	-06	05	03	06	-21	37	-04	13	21	28	09	09	-02	78
37	-32	12	06	-15	-10	-05	07	-19	20	-03	-25	-08	-17	05	-30	-08	03	-11	-10	41	-11	06	02	-08	06	-12	07	-18	16	07	73
38	-48	29	05	01	-12	-25	21	07	-02	22	18	-15	06	18	-13	02	13	12	-05	-08	-13	00	18	-04	05	-10	08	16	-09	15	78
39	-46	-47	-48	16	-07	-09	03	00	04	-08	-04	09	-02	07	06	06	08	08	-18	10	-11	01	08	07	-09	04	-09	07	-01	08	84
40	-47	-25	-42	17	-10	-22	01	14	04	-07	03	17	-04	13	09	12	07	02	-09	14	01	16	-01	14	-19	12	-07	-09	06	-18	81
41	-30	-49	20	-14	-06	-15	-13	-07	18	07	10	-38	-15	04	-00	-05	-06	-07	02	03	-05	-02	-07	05	-12	-04	-07	-02	07	08	71
42	-41	-28	-04	-08	-22	12	-13	-25	07	-13	11	-06	-17	38	01	13	-05	-03	-08	-09	13	-02	-01	-07	-12	07	13	-07	-04	-16	73
43	-42	-58	13	-10	-10	-11	-02	-07	-07	09	08	-03	11	00	03	-10	-03	-03	-09	05	11	14	-02	04	11	-01	10	-02	-01	07	68
44	-44	-27	01	08	-21	-15	-16	-42	06	-23	08	02	10	-13	02	06	-02	-06	01	02	00	-16	07	-08	16	02	-05	07	-13	07	73
45	-37	-35	-19	27	-16	02	-19	-06	17	-02	-13	17	19	-06	-34	-06	11	17	-13	-01	20	-03	04	00	-01	09	-04	11	07	-09	81
46	-36	-29	-31	30	16	-11	-12	-03	26	-17	-21	09	31	02	-16	-06	04	-10	-13	01	-14	-02	-17	-17	-14	-03	09	00	-01	12	87
47	-35	-41	03	03	23	-22	-06	-35	-01	-15	-08	08	02	15	01	01	00	-01	-03	-05	-13	13	02	06	04	11	05	00	-07	-22	68
48	-28	-43	02	28	-06	-15	-24	-20	-09	-13	02	00	06	22	00	-05	-02	32	07	-06	08	-09	11	-14	08	-12	19	-12	13	10	80
49	-47	-41	-05	22	05	01	-18	00	01	-15	-14	10	00	-18	06	-23	27	00	-07	09	-03	-05	02	00	02	-16	-08	-04	06	-02	75
50	-41	29	-03	26	-01	-26	-28	16	-29	02	-21	03	-09	08	02	07	-06	06	-11	05	-11	-11	15	-19	08	05	-06	-01	-05	05	77
51	-38	30	17	15	14	-37	-12	23	-27	00	-06	-19	-20	-04	-10	12	09	15	02	13	04	-02	08	-09	-10	-08	02	05	-05	-06	78
52	-39	23	-15	-12	04	-21	-10	05	-34	05	-06	08	-08	04	-23	17	12	-13	-15	01	-01	02	39	-03	06	05	05	-05	18	11	78
53	-12	09	-30	20	-22	-22	46	-27	14	21	12	15	-08	-31	-02	05	-02	-01	-03	06	09	-11	03	-05	13	04	09	-08	16	03	82
54	-07	07	-42	11	-08	-17	44	-28	13	32	-08	-11	-07	-28	-11	17	-12	02	-12	-08	-09	-07	03	-02	08	03	11	-01	00	06	84
55	-16	17	-20	20	-11	-16	49	13	13	-06	03	-29	-03	-15	-13	-12	-08	12	03	-00	-12	03	-13	04	-02	-30	-06	11	-05	-22	80
56	-36	34	14	-33	-24	-05	-22	01	11	-11	-22	15	07	-18	22	09	02	-04	-27	-06	03	02	-10	00	-07	-13	-04	-04	-09	-06	80
57	-48	37	21	-34	-28	-09	-12	03	-02	-14	-08	-06	21	08	-02	05	-05	07	02	-02	-17	01	02	-07	00	19	-02	00	08	-19	83
58	-36	27	01	-14	02	-07	27	23	18	-17	-02	-04	23	03	-17	-12	04	02	-04	17	17	-11	-14	-25	01	19	-07	-03	01	-11	72
59	-31	36	19	-18	-17	00	-06	-05	08	-09	25	-04	-03	07	21	-07	-30	28	-12	-06	-21	03	03	-04	-13	-09	-03	25	10	05	80
60	-42	24	15	-20	-34	05	18	00	-07	-22	13	-03	08	03	-10	21	04	-05	-02	-07	10	-19	-06	19	06	-14	-23	-18	04	-04	78
61	-28	21	-06	-12	-49	02	-17	13	02	-17	03	-04	-01	-09	06	05	25	12	11	19	21	-05	-11	09	13	17	18	06	05	03	75
62	-25	24	-13	16	03	26	-28	-10	03	12	25	-29	16	-16	03	-14	-03	-08	05	21	-24	-04	01	12	02	-08	03	-21	03	-26	80
63	-35	01	06	01	13	53	07	-19	-22	-29	-02	10	-18	-13	-18	-01	-07	14	10	-03	-11	-05	11	-04	15	06	05	00	-01	-05	78
64	-43	-09	-56	-23	-09	09	-06	09	06	12	-01	00	-03	01	07	07	04	07	17	-06	-19	-04	06	-11	-14	03	00	-08	03	02	74
65	-21	31	10	12	-03	21	15	-15	-13	22	-22	-03	03	-04	27	-14	26	-06	-08	11	-05	-03	09	-06	-14	16	-07	-07	08	05	64
66	-54	27	-04	35	03	14	-15	15	-13	14	-10	-13	04	03	02	-09	06	-04	13	08	-18	12	-09	12	10	-10	02	03	-16	00	78
67	-56	36	01	-21	17	19	-11	-06	-07	07	00	01	-15	-13	-14	-14	00	-16	01	-01	12	-17	-01	13	-22	08	00	02	02	-03	80
68	-42	14	13	25	15	33	17	04	21	-28	-15	-04	-06	-09	05	03	-11	-11	-03	-07	-02	28	09	-17	07	-04	-05	10	04	07	78
69	-41	25	-34	03	19	01	13	12	-04	-43	13	03	02	-14	-01	-17	-06	-06	03	01	-05	10	13	05	-05	-06	-01	-08	-06	-03	72
70	-51	10	-32	-21	34	-11	00	-20	09	-07	-08	-10	-08	-03	-06	-03	-07	-12	-01	-13	20	-13	-05	05	12	-17	11	00	-09	04	80
71	-42	33	-17	-24	20	-23	-06	17	-25	12	10	18	06	15	-20	-13	-01	-06	02	03	05	00	-08	-04	-08	01	17	02	-06	05	75
72	-33	-19	-28	-34	20	24	-07	-02	-18	20	-09	00	-11	-11	10	03	19	00	04	-14	19	-11	-02	-15	02	-14	06	03	-05	-18	75
73	-18	14	-14	-21	36	02	04	-11	31	-05	15	12	-16	22	08	-15	13	12	-12	-05	-20	-36	01	02	-10	10	-15	19	-09	00	81
74	-37	28	02	-37	-36	-19	06	-07	-02	06	-12	18	08	-18	-02	-23	03	-19	01	-06	07	02	13	11	-05	-05	-05	-13	-22	11	82
75	-12	00	-43	-26	27	-24	-07	03	03	-13	-01	-33	09	06	29	06	08	09	-01	-12	09	20	05	06	11	-08	-02	-03	08	09	75
76	-26	18	-41	-09	18	-32	03	-24	13	-25	00	-08	-08	-02	-07	-09	14	-14	09	00	00	24	-01	02	04	-03	-06	12	-18	-12	76
77	-51	23	15	-07	31	17	-05	03	21	02	06	14	06	-10	15	20	-03	-02	25	16	-03	-18	03	07	21	-10	-03	-02	08	09	82
78	-52	21	07	-05	00	10	02	-12	15	38	-26	-13	01	-01	-03	31	06	05	-14	16	07	15	-02	-01	09	-05	-10	07	14	-11	83
79	-43	21	07	02	47	-06	03	29	00	-11	06	21	08	-02	-03	-05	04	14	-07	08	08	08	-16	02	13	05	05	-11	09	-01	72
80	-53	29	00	15	17	19	-01	-23	17	06	01	08	05	-01	17	-07	-23	-11	-13	-04	03	-04	-02	-13	-20	05	-01	-13	-07	07	75
81	-50	19	-13	-08	22	-20	-12	-11	-10	-16	28	-15	33	05	04	-12	-04	06	06	07	09	-02	-19	02	00	09	-10	-10	18	14	82
82	-30	-12	-34	-06	-14	39	00	03	11	20	10	03	02	02	-32	-21	03	10	-02	-23	03	-05	00	05	-03	09	-04	-04	22	01	73
83	-34	-14	-45	08	-32	28	-14	19	03	13	-03	04	-17	10	-03	-09	-01	-13	23	03	-05	00	-02	-17	-05	-05	-20	-06	01	03	80
84	-38	-06	-45	-25	-14	09	02	10	00	02	-05	-11	-19	17	-01	-04	21	05	27	24	-03	03	-04	06	08	05	-17	13	10	-05	78
85	-61	-02	-16	03	17	24	-09	-15	00	13	21	-13	-03	-13	08	00	-03	-16	-01	01	16	05	01	17	10	-02	-01	01	-14	10	74
86	-32	16	18	07	-39	-02	-13	-09	16	-29	-01	15	-06	-15	-09	22	13	10	-03	-01	-09	-09	05	17	20	-07	00	04	-08	11	70
87	-34	-13	-48	-19	00	23	-22	26	-06	-08	04	-11	-06	-16	12	03	-15	00	-08	07	-09	-11	-06	00	14	12	02	06	-03	03	74
88	-32	35	04	-28	-21	-21	-20	04	29	11	-14	14	09	-09	14	-22	-19	10	-09	-01	02	-07	14	-02	02	-06	11	-10	-01	-18	79
89	-55	18	12	-11	-23	12	01	-05	10	-12	-04	-07	-33	11	-11	-16	-18	25	-06	-17	06	25	05	-10	-01	-06	-06	00	00	03	84
90	-63	21	11	10	24	10	04	-17	10	06	-27	-10	-09	-02	-11	13	00	00	-09	-02	05	-07	-01	06	-18	-06	00	02	18	03	78
91	-59	19	20	17	22	13	-05	-04	-16	01	-11	-15	02	00	-04	08	21	06	06	03	05	04	-12	03	-15	-10	09	08	01	07	72
92	-19	-30	-04	-09	13	04	20	06	-04	-11	22	38	13	06	-07	-01	09	08	18	11	-05	-04	29	01	-19	-36	08	-08	-11	-06	77
93	-13	-32	25	-05	14	-23	-17	-04	-19	-04	-02	-08	-37	-30	-03	06	13	-01	10	-03	-06	-28	02	-03	-02	00	-17	07	05	-14	74
94	-26	-38	34	-28	03	09	16	01	-03	-04	-05	01	17	02	15	13	28	05	-03	-03	-06	-06	-14	13	-09	-32	-02	-12	08	15	78
95	28	46	05	12	11	08	-19	-26	02	-22	24	12	-01	11	-10	15	24	14	09	02	-06	-03	-08	11	-13	14	-03	01	09	08	74
96	00	-11	00	05	10	-05	03	37	10	-31	-35	-26	-08	19	-13	-02	-18	-19	-18	-03	03	-21	-12	05	07	03	-02	-04	-04	19	72

Note: Decimal points omitted.

Table 9

Unrotated Factor Matrix for Problem III

	Factor																														
Var.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	h^2
1	27	-04	09	-33	30	-02	-16	-24	27	18	03	08	09	05	22	17	25	11	12	11	04	-18	16	-03	-15	-15	-10	-07	-08	-02	79
2	42	-20	-08	-14	02	02	-08	-20	41	05	-01	02	30	10	13	20	11	06	23	-15	-03	04	-08	00	-12	04	-13	-04	11	09	77
3	24	-21	21	07	00	-18	-19	-11	44	29	14	00	08	16	17	17	-09	21	11	01	07	09	-07	05	13	10	07	05	-11	03	75
4	29	06	23	01	08	03	03	-13	18	23	-02	13	-24	-13	05	38	00	-08	38	03	-05	03	-08	-21	-02	-04	18	03	05	-22	78
5	37	-26	-13	03	-05	12	-11	-12	27	01	-31	11	19	-13	15	-07	-04	-01	-21	-09	-05	04	-10	-27	-17	-07	-22	-01	-03	-12	77
6	14	03	-07	06	-07	-29	13	-13	-28	-00	-06	-02	14	03	-18	28	18	-27	14	17	-17	14	28	06	14	16	-10	10	-14	-01	73
7	18	-01	-29	-03	04	13	19	-06	08	-27	-15	-08	-31	-28	17	01	26	29	06	05	-13	07	11	04	-17	07	15	-06	03	14	76
8	51	23	-16	-02	03	-01	33	16	-04	12	-03	29	17	11	19	06	08	-04	13	-08	-06	04	02	-08	03	-13	-08	-19	07	15	79
9	18	06	-02	09	-10	15	01	30	06	-25	-31	10	-02	-02	-07	35	-13	-19	07	-05	02	-34	13	-17	33	-12	-05	-06	-06	05	82
10	43	-20	-04	-08	09	10	15	-09	04	21	-27	03	-14	19	-29	-04	-12	01	00	-12	-17	-07	05	25	15	14	12	18	-03	-10	78
11	29	-10	-15	-30	-24	-03	01	06	-17	01	03	38	-01	-10	-03	24	-37	15	-02	01	03	38	-01	-10	-03	24	-37	15	-02	-18	79
12	47	48	19	-32	09	01	20	05	-01	16	-16	-04	-02	10	-04	-04	-07	-09	-02	13	-05	03	-10	12	-09	-01	13	16	06	-06	82
13	52	-04	-02	-24	22	-02	08	10	08	-11	-07	-02	17	-14	-14	-17	-13	17	06	-06	-08	-08	09	09	-10	07	06	-09	-06	-14	64
14	01	-25	16	02	-02	10	10	11	-02	-19	41	13	31	12	06	19	06	29	-15	-20	-18	-15	-06	12	16	05	18	00	01	09	78
15	19	-12	06	-13	31	20	08	-10	-19	-13	-00	31	22	-27	09	-02	19	-25	-02	-12	15	-08	-19	-11	10	-09	15	24	-05	20	83
16	41	48	-31	-12	-12	-13	26	-25	10	11	09	-06	-02	07	03	-11	-04	01	-10	04	11	-05	-03	03	-02	07	02	02	-14	09	78
17	39	60	-28	-14	-12	-23	20	-03	13	01	09	09	06	10	07	08	-10	08	-05	-02	07	-12	00	-08	-05	08	-03	06	01	-05	83
18	44	37	-18	-10	-20	-33	19	-04	10	16	12	-06	03	07	11	-10	-03	22	-11	00	07	-05	04	-13	13	04	24	-10	16	06	84
19	42	-09	-09	-01	-04	-05	-04	-01	04	-03	23	22	-04	-23	-21	-16	22	-11	-06	-19	01	01	14	-10	-19	06	34	-03	-23	-08	78
20	40	01	-01	-10	00	34	-22	12	-11	-35	07	02	00	31	-07	-08	06	02	13	-07	01	09	-02	15	-18	10	-03	-04	-01	-12	71
21	26	-15	-03	-07	28	14	-18	-12	-04	18	18	34	-15	15	16	-14	06	-15	16	02	-09	-24	00	-04	09	-14	31	03	01	00	76
22	33	-05	-24	-01	15	-08	-19	05	-04	-03	02	07	-26	-23	-35	-04	22	-09	05	12	-06	07	-05	27	21	-03	-15	-02	19	-08	76
23	06	07	-03	-11	-04	27	24	14	-07	-15	26	24	00	-09	04	13	00	30	12	50	-10	04	-11	12	-07	05	-10	12	-17	01	81
24	28	16	-17	01	15	01	11	01	15	-08	-10	19	-34	18	11	02	17	11	-20	-07	-13	13	-05	-13	28	00	-09	17	-17	02	68
25	67	03	-08	02	-16	01	16	14	08	-17	-10	02	15	04	10	-14	10	01	17	12	14	10	-04	-12	00	03	-04	-00	01	03	73
26	49	-07	-35	-20	20	22	-01	06	-25	-01	07	-25	-05	-05	09	04	-01	07	-05	-22	-04	-15	-09	08	-19	08	-05	-02	03	13	80
27	40	04	-14	-31	03	19	-11	06	-03	09	-17	02	00	03	-06	-29	-07	-14	21	-10	-31	13	21	-04	-06	-18	-14	-01	07	06	76
28	59	-05	-36	-30	15	06	-09	26	-18	05	-07	-19	05	-02	00	12	11	-09	-06	-04	02	-03	03	-05	08	19	04	-14	00	-06	86
29	58	03	-18	-27	13	-08	-33	13	-09	-02	-11	-07	15	-03	-10	17	07	-21	-10	04	11	14	-05	09	11	06	-03	03	-02	-07	80
30	55	21	-32	00	12	-01	05	17	07	-09	09	-02	-06	-01	-12	23	06	-07	-18	-15	-09	-04	-04	[illegible]	02	05	-02	10	11	-30	78
31	15	00	-23	09	08	30	20	18	01	00	-08	-02	-18	22	17	24	-11	-17	-11	-17	25	17	30	00	-22	03	22	10	01	23	85
32	41	16	-11	-01	-13	01	-11	-12	-23	-03	-23	29	-21	03	-02	-27	-01	07	-16	12	-11	14	-07	-29	-03	06	00	06	-05	07	73
33	32	00	35	-07	15	-07	-09	26	-09	10	-17	-02	-12	28	-03	-01	-09	21	08	14	-05	-08	13	04	02	03	-01	-04	[illegible]	17	63
34	02	17	00	04	-05	-10	-17	01	04	-09	-25	-08	13	-23	20	-04	-28	-21	12	23	-11	-04	-33	11	-07	02	24	-09	-15	08	70
35	32	-01	-20	-03	-04	-10	18	-27	-19	-32	-09	-06	08	-08	-27	05	00	18	27	01	04	08	09	-11	06	-06	17	-02	-03	-09	68
36	20	-05	-03	-30	-02	04	12	-32	-19	11	-02	-19	06	11	21	-13	23	-21	04	15	12	-11	-05	-05	05	43	02	-12	10	-09	78
37	32	-10	-07	15	05	-16	13	-18	10	-14	25	-15	-13	-32	-07	19	-10	-03	-13	37	09	05	06	-08	02	-19	09	02	21	07	77
38	49	-29	-05	-02	27	09	18	-05	10	-07	-23	-13	19	-22	-09	-16	-11	-03	10	-08	13	03	-04	01	19	11	01	-14	-13	05	77
39	47	45	49	-13	17	15	-08	-04	-05	-01	12	05	08	00	-05	-01	-07	06	-03	07	12	03	-03	-04	-05	07	-05	01	02	-02	81
40	48	22	41	-13	26	23	-01	04	-11	02	04	13	11	00	-09	07	-02	10	-03	13	-01	13	-06	03	-10	-01	06	26	05	-16	80
41	32	49	-19	03	08	02	15	15	-01	-24	-01	-35	-20	-04	12	06	08	-03	11	-02	04	-05	-03	06	-02	-05	01	08	11	-07	74
42	58	43	09	19	10	06	-18	-11	05	-04	-15	-07	08	-09	-10	05	07	04	-12	06	-08	12	08	06	-13	-07	11	-05	-12	04	79
43	44	61	-26	03	01	09	09	-03	05	-06	03	-10	10	-02	09	03	-08	08	-11	06	03	01	-16	-03	09	03	-06	07	-20	08	81
44	39	28	27	12	27	00	-32	-28	-32	-06	06	05	02	-02	01	-03	04	00	-12	02	14	00	09	02	00	-08	-01	-17	16	20	83
45	36	57	25	27	-02	06	-23	-06	04	-11	04	06	-02	-17	04	-04	-09	03	07	-08	-15	01	12	00	-04	13	03	-10	04	02	79
46	23	47	02	39	02	16	-29	-13	07	08	13	-05	02	-03	-10	06	03	02	-12	-01	-19	-15	01	-15	06	18	02	-20	02	08	79
47	38	44	08	29	04	32	-16	-01	-08	-01	18	10	-01	14	08	00	-08	-14	09	-09	03	-02	-15	06	26	00	-03	08	06	08	78
48	44	57	-02	38	14	03	-18	-14	-04	-05	00	00	17	04	-05	-04	-14	-01	-11	-01	10	-04	04	03	-01	-03	-07	04	06	-14	86
49	48	58	05	27	07	01	-23	-06	19	08	-07	-10	05	-04	04	-01	-09	07	04	-03	-05	-07	20	09	05	-03	-07	07	-04	02	85
50	40	-33	01	08	14	33	-03	33	14	25	16	10	07	-09	02	-11	-10	02	10	11	15	01	13	-14	-11	07	-11	-04	09	-15	81
51	38	-27	-17	15	10	46	14	14	11	24	05	-12	-10	-11	-19	-20	-01	11	07	14	04	04	09	12	11	00	01	-15	-01	07	82
52	39	-22	16	19	-01	13	15	12	21	24	-04	12	-03	-14	-20	02	-09	-28	00	12	28	16	-08	04	02	21	-05	00	10	17	80
53	09	-18	29	-30	32	05	14	-34	19	-33	-10	17	-21	17	-08	-03	-07	-11	-07	13	-09	-11	-03	-08	-03	07	-01	-03	15	10	82
54	05	-15	38	-27	13	04	25	-25	35	-38	06	-03	-15	19	-13	-09	-24	-14	-02	-04	05	-07	02	-10	00	08	00	-04	01	-02	85
55	14	-24	16	-32	31	06	22	-26	-02	01	06	-30	-08	-01	04	-10	-21	11	-08	-09	02	-11	-01	05	23	-29	-09	-03	-10	-09	78
56	37	-25	-11	46	13	-26	01	10	-10	-04	21	13	04	26	-03	-11	-06	-15	-01	03	-10	06	02	06	-09	-23	07	01	-14	-07	80
57	48	-32	-19	38	17	-32	12	08	-02	13	-04	-10	09	08	-01	08	-04	07	04	-03	11	00	11	-20	-05	10	07	10	04	-06	82
58	36	-26	-03	05	06	-12	19	-25	-23	19	-06	-15	17	-10	-01	-01	-09	03	-12	15	-32	-17	29	-12	-00	06	-16	09	00	08	79
59	32	-28	-14	26	12	-12	-03	-04	-20	-11	-13	-04	-04	15	32	-16	-18	13	31	-05	16	04	-02	-04	19	05	02	04	-09	-08	76
60	42	-21	-12	09	25	-32	00	-15	-05	14	-15	-06	-05	04	-18	12	-07	-06	17	-05	-02	-11	-12	08	-26	-16	-07	05	-12	19	75
61	28	-20	09	18	37	-29	-11	18	-15	06	02	-08	-07	04	-19	-07	22	11	04	15	-21	-16	-25	-01	06	14	02	01	14	08	77
62	24	-28	13	-07	-16	-01	-30	23	-02	-18	-25	-34	-03	13	12	03	01	01	-20	18	17	-10	01	-01	-03	-22	17	02	08	-08	77
63	32	-07	-05	-20	-37	-28	-28	-16	00	27	04	10	-34	-02	-04	01	-10	11	03	-01	18	-01	-02	-11	01	05	-06	01	-04	-05	75
64	44	68	59	-31	-02	-19	13	19	-05	-07	04	03	06	-01	-08	-04	06	11	01	-08	15	-06	25	04	05	08	08	02	03	03	79
65	20	-31	-10	-04	00	-11	-23	-12	30	-05	14	01	20	08	06	-27	24	-10	-13	15	15	-03	12	10	03	03	-09	28	-05	09	72
66	52	-33	00	-21	-03	13	-26	26	09	06	09	-13	13	-12	-01	02	07	12	-18	02	06	01	-07	-11	08	-19	13	-06	-23	02	83
67	57	-32	01	18	-32	-09	-04	03	08	02	-02	04	-20	-12	08	-03	01	-12	-10	03	-06	-20	05	26	-01	10	06	13	-08	08	82
68	51	-19	-15	-26	-15	-02	-27	-20	-27	06	33	-06	-08	06	00	11	-12	-11	-01	-04	-01	25	12	-11	18	-03	-07	02	-04	03	80
69	41	-27	35	-03	-05	11	-02	-26	-31	28	-03	-05	-14	05	10	07	-02	04	-23	02	10	07	06	11	-01	-08	06	-10	01	02	76
70	50	-11	31	15	-33	12	22	-15	04	-07	12	-09	-16	00	06	13	-01	-18	04	-10	-13	-08	-14	02	-07	-05	-02	-20	-08	-06	79
71	43	-29	17	23	-11	15	28	08	07	20	-25	18	10	-23	06	01	-03	01	-13	02	-11	-08	-03	02	10	02	04	-08	10	-07	74
72	35	19	31	03	-40	-18	09	10	18	03	03	12	-03	02	-09	-23	21	-14	08	-07	-10	-04	08	14	05	-09	-08	-17	07	-05	74
73	22	-02	16	24	-25	12	02	-29	-26	-26	00	08	09	-23	13	-17	01	05	12	-07	23	-34	06	01	-05	06	-14	12	-19	-07	81
74	37	-25	00	25	28	-34	27	02	11	-02	-03	16	-05	05	16	02	10	-14	-28	-04	-02	06	-03	23	-12	04	-09	-10	-12	-02	82
75	14	04	46	25	-15	18	24	-04	-11	05	09	-31	13	21	-01	-11	17	-01	10	-12	05	27	-13	-01	-01	-06	-04	-01	-01	14	77
76	25	-17	41	26	00	23	18	-27	-01	-07	07	-18	-18	-07	-02	22	18	02	-16	-07	00	17	-02	-06	06	-03	-08	-07	-19	-11	77
77	50	-29	-16	-06	-36	-01	09	00	-26	-16	01	13	05	19	-11	18	16	04	10	14	11	-16	-06	-09	-05	-07	-02	-13	05	16	86
78	51	-21	-09	02	-11	-09	03	04	26	-28	18	-08	17	06	-26	-04	-13	-08	10	17	-06	13	-04	-06	07	-09	-07	09	03	11	76
79	41	-24	-10	-04	-32	24	17	-09	-25	20	-06	16	12	-01	-06	-11	-03	11	-17	02	-15	06	-10	-10	-04	-14	03	15	20	-06	79
80	32	-31	-01	-02	-21	06	-24	-13	00	-25	07	08	06	14	23	05	-10	-10	02	01	-07	-01	20	10	-09	02	05	05	03	-11	74
81	50	-17	13	23	-14	19	03	-10	00	12	-33	-24	05	19	16	14	08	15	04	-05	-12	-04	-07	-06	-07	-03	-03	18	15	08	80
82	28	05	31	-24	-11	-36	-09	11	03	-15	-18	00	-05	-21	02	-06	-18	01	-10	-23	-00	-06	-10	04	-06	04	-05	14	19	11	69
83	33	05	44	-27	09	-23	-15	36	-04	-06	05	06	-04	-24	06	10	11	02	00	01	-01	02	17	-09	02	-09	-12	00	00	10	76
84	37	01	46	-07	02	-26	20	13	-01	-01	08	-08	-04	-22	-05	-03	28	06	11	-30	07	03	-09	00	01	01	-10	18	02	-02	78
85	60	-04	16	-16	-31	02	-16	08	04	-16	-14	-10	-14	11	04	06	09	-13	-02	06	-14	03	-20	00	-10	03	-02	-08	-16	-05	78
86	30	-18	-16	16	33	-16	-17	00	-17	-05	11	08	-22	11	-33	07	-05	07	-05	-05	14	-10	-25	-12	-13	06	-20	-17	-03	00	77
87	34	10	48	-08	-22	-17	02	35	-20	16	05	-10	-08	14	04	-10	-05	-04	04	12	-02	-10	-07	-18	-06	03	04	06	-12	-04	77
88	31	-33	-04	36	16	-18	23	20	-15	-23	12	12	07	16	25	-07	-14	04	-13	06	02	-05	01	02	-07	00	-06	-09	09	-21	81
89	55	-18	-08	04	10	-25	-05	-03	-08	-06	18	-04	-26	-24	19	-16	-19	11	19	-15	-05	31	-03	02	04	-03	02	-03	03	03	85
90	62	-23	-14	-03	-24	10	-07	-12	16	-12	26	-06	-05	-02	-11	03	-12	-06	04	01	02	-08	-01	12	-01	-02	02	02	20	03	76
91	59	-19	-22	01	-21	13	-19	-03	18	11	08	-12	03	-02	-19	-06	12	07	-05	-04	-04	-04	-09	09	16	-04	01	-03	02	-03	71
92	18	23	05	-18	-05	-05	14	-18	-21	13	-27	30	10	-05	-06	13	03	13	-04	10	27	03	01	29	05	-14	-02	-18	02	-20	73
93	14	32	-24	07	-06	25	13	17	12	11	08	02	-45	03	-14	-14	13	03	05	03	23	-24	07	05	-05	-15	-20	10	-05	03	79
94	28	42	-31	04	-06	-23	08	-16	01	07	-02	00	17	11	-20	-05	16	-03	07	-09	06	-03	-14	13	-04	-30	10	00	07	-01	72
95	-27	-37	-04	27	-09	11	-34	-17	-07	-05	-18	01	-06	-09	-22	10	08	22	11	-07	11	-10	-04	05	-06	09	01	21	06	-02	72
96	-01	09	-04	-07	02	09	18	07	-23	30	41	-28	08	-21	12	06	-19	-24	06	-01	-08	-18	-02	-01	-13	-05	-08	11	-08	-03	70

Note: Decimal points omitted.

Table 10

Rotated Factor Matrix for Problem I

Var.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	h^2
	Factor																														
1	-06	-04	-11	-14	-14	03	-10	-10	-76	07	09	10	08	08	02	-09	06	-12	08	-01	-04	-01	-08	08	02	-20	16	-05	-08	00	81
2	-27	-14	09	-16	-07	-02	-07	22	-71	10	-08	-07	-16	03	-11	-03	-05	04	-11	03	08	08	-07	09	-01	10	-08	07	02	-06	81
3	-12	-03	-15	02	01	-07	-03	16	-56	-07	-17	-10	-13	-22	11	20	-16	11	00	05	-04	-05	-01	-18	19	-18	-08	10	04	03	71
4	17	-06	-10	-16	-14	08	-02	13	-33	-07	09	-17	12	-05	18	-08	-39	13	-02	-10	07	01	-09	-02	-16	-34	01	03	22	-04	70
5	-19	-00	14	-05	-01	-19	-17	17	-35	-11	-17	-09	20	22	-05	04	-07	15	-11	01	-21	37	01	08	-12	20	-10	-10	-08	-03	72
6	-05	-04	-03	05	09	-07	-07	-11	00	07	04	-02	06	03	07	05	-07	-08	04	-10	78	02	-06	05	-12	08	11	00	04	-02	74
7	-03	-07	07	04	-03	00	-03	05	-03	00	-12	-01	06	01	08	-82	-02	-04	13	-12	-05	09	-01	03	02	06	-02	-03	02	09	77
8	10	-48	-09	-12	12	-30	-06	14	-17	11	-05	-14	-09	14	-06	-08	-07	-04	08	-02	06	14	04	44	-21	-10	08	-03	09	07	79
9	-07	01	-08	-08	-03	00	-10	08	06	-11	-04	01	01	03	00	01	02	04	-02	-03	09	01	04	00	-86	00	01	00	03	09	62
10	-11	-12	-03	00	-25	-01	-17	36	02	-06	-15	-14	00	-13	-28	-04	-06	00	-09	-03	27	30	-15	-13	00	-34	04	-08	-19	11	77
11	-17	-07	-06	-08	-01	00	-13	07	01	-03	00	-73	-13	01	-08	00	10	03	14	-06	06	11	-06	09	-03	00	17	01	06	09	72
12	06	-51	-39	-19	-20	17	-15	09	05	04	07	11	07	00	-10	-03	-04	24	06	09	11	12	-07	18	09	-15	20	-04	-03	15	82
13	-12	-22	-21	-17	-21	-16	-26	36	-12	-14	14	00	-07	00	-23	-21	21	08	-09	-17	03	11	08	-06	-02	07	15	07	-12	-21	76
14	-08	11	-08	-01	-02	-15	-04	-09	-05	-04	01	-11	-73	-09	-03	08	-03	-19	19	01	-12	10	09	-08	01	-02	08	-01	-05	-04	74
15	04	07	-06	-07	-11	-01	-12	09	-03	06	00	03	-07	82	02	-01	01	04	04	-02	03	09	-04	02	-04	-17	02	05	02	05	78
16	-14	-83	06	-03	-04	06	-02	04	-04	04	11	-01	19	01	-01	-04	-02	00	03	-00	06	06	-01	-08	11	04	09	03	-02	04	81
17	-02	-83	-06	-18	03	-02	-05	-10	-09	06	02	-14	03	-03	01	01	12	05	09	-05	02	-04	00	-01	-09	04	02	-05	01	07	83
18	-03	-77	-20	-01	09	-07	-07	00	-04	09	-05	-11	-05	-18	21	-03	04	-05	-09	-10	-10	14	09	-01	06	-05	-03	03	02	-05	83
19	-24	-14	-11	05	-04	-15	-25	14	-01	-18	14	-17	10	30	-02	-13	-08	-19	-12	-28	-09	01	01	-01	16	-18	00	-22	26	-08	72
20	-38	03	-01	-29	-17	-08	-31	-05	10	08	-08	06	-06	-06	-48	-08	-09	-05	12	-18	-06	-10	00	13	01	-05	02	12	19	06	78
21	-13	01	03	-10	-08	-13	-06	04	-15	06	03	-01	01	22	-05	06	09	-04	04	05	-12	05	-07	10	01	-74	-02	07	-07	-01	74
22	-25	-05	01	-13	18	-18	-15	07	-03	13	-06	-04	09	11	16	-43	05	05	00	37	08	-11	03	08	-06	-23	11	21	-06	-18	74
23	-03	-04	00	-07	-01	02	05	07	02	-02	04	-07	-11	03	01	-11	01	04	86	-05	04	-01	05	00	02	-01	04	-01	05	-03	80
24	08	-35	00	02	-11	-13	-21	-06	-06	-19	-33	-01	23	09	-15	-17	-16	-20	18	25	04	07	04	-07	-14	-15	-11	17	-03	03	73
25	-31	-37	-23	-08	06	-22	-13	31	-10	16	-20	04	07	10	-02	-08	-12	09	15	-17	01	08	02	23	-16	12	-05	10	07	01	75
26	-15	-16	07	-21	08	-10	-44	12	01	25	24	-13	-10	08	-21	-31	03	-01	05	02	-07	13	-24	02	03	-03	-15	07	-26	15	81
27	-17	-06	-09	-06	-07	10	-21	16	-05	-08	05	-10	24	-01	-25	-12	12	-02	-06	-12	08	19	-01	60	04	-14	-06	00	-13	02	77
28	-11	-20	-10	-07	11	-11	-70	20	-06	25	09	-08	01	03	-08	-19	13	-04	-04	-02	08	08	-10	11	-14	-01	02	05	-09	08	84
29	-21	-13	-14	-13	05	-01	-75	08	-09	11	-14	-08	04	14	02	05	05	16	-05	-02	19	-07	-13	07	01	-06	09	-01	01	05	85
30	-09	-47	03	-24	-03	-17	-47	10	02	-13	06	-07	-01	05	-03	-16	-07	-10	-03	04	10	00	-11	-04	-21	-01	-14	-08	09	-02	72
31	01	-10	11	-10	00	-12	-10	14	03	00	-01	-01	00	02	-03	-12	-01	-08	-03	05	-01	01	03	00	-09	-02	-06	04	04	81	79
32	-10	-23	-06	-27	-01	-10	-07	-05	22	03	-29	-15	45	14	-02	-04	05	00	07	-04	-05	40	-06	16	04	-06	04	10	05	-08	76
33	00	02	-51	-05	-15	-08	-07	09	-06	-08	02	13	06	-31	-17	03	04	-04	11	07	01	18	-18	05	-09	-10	10	19	10	01	62
34	-01	-04	00	02	05	02	-02	-06	01	-06	03	00	11	03	03	01	05	82	04	03	-07	-01	00	-01	-04	01	02	03	05	-06	71
35	-10	-18	04	03	-08	-04	-10	03	01	02	-11	-07	01	04	06	-18	-05	-04	07	-65	21	07	-13	07	-03	06	09	13	-11	-07	66
36	-07	-14	01	11	-17	05	-16	02	-08	74	08	02	06	08	-04	-02	-07	-01	-04	-02	10	10	05	-01	15	-06	07	03	-01	-03	72
37	-21	-12	01	-13	-14	-18	-06	13	03	-04	07	05	01	00	75	-18	-05	04	04	-07	10	03	-02	-10	01	02	-02	05	-05	-02	79
38	-09	-04	-06	03	-20	-17	-18	59	-09	06	-03	02	-03	22	-01	-13	-01	10	-19	-16	05	10	-09	05	-09	10	06	19	-21	-05	74
39	-02	-26	-44	-57	-22	12	-07	10	-05	00	11	13	06	12	-08	12	-15	05	14	-02	-04	-02	00	01	08	01	20	11	04	-01	84
40	04	-08	-37	-55	-17	01	-17	16	-03	-08	00	12	-06	14	-07	04	-11	06	22	-03	08	14	-04	03	15	-10	16	00	00	05	74
41	-03	-46	-11	-13	01	01	-15	-04	16	04	13	27	04	-05	00	-47	-09	12	00	-09	02	-19	-04	06	-15	00	-06	09	08	14	74
42	-23	-02	-05	-39	-05	-04	06	-15	10	00	09	-10	06	19	04	-21	-21	-17	-02	-34	04	03	-09	23	-13	-22	-01	-04	21	12	73
43	00	01	-05	-74	07	08	-11	-13	00	-06	-15	-05	-01	05	12	00	-19	02	03	-16	-09	-02	04	-09	01	-09	02	-13	08	05	75
44	-10	-06	-13	-61	12	-11	06	01	-06	-08	-05	-13	-10	-23	19	07	-01	00	01	21	-08	08	-15	-01	-08	09	-15	-07	-13	10	72
45	-04	-18	-13	-65	-04	-03	-6	-06	-03	-07	22	-17	15	-04	-16	-01	05	-19	03	03	-09	-01	-11	12	-11	20	03	14	-08	10	78
46	-06	-14	-17	-62	04	00	-07	12	-12	02	-09	-01	-06	05	01	-05	-04	03	-16	06	14	01	11	09	-23	-19	09	01	01	-05	66
47	-25	-20	-04	-51	11	12	-12	23	-16	02	-07	09	24	18	-07	-20	03	-06	01	26	09	05	08	00	07	07	-10	13	13	-19	81
48	-04	-02	-05	-44	03	-04	-14	02	-20	11	08	-01	-01	03	04	-06	08	06	06	05	-20	06	09	-06	07	-07	10	05	47	-02	60
49	11	-05	08	-43	06	-24	-24	12	-14	20	09	28	29	-08	-07	02	-09	13	11	-13	17	12	05	-05	12	-17	00	-29	03	03	80
50	-13	14	-10	-12	03	-22	-16	63	-18	02	22	01	07	00	00	06	07	-13	14	00	-22	12	05	08	-04	-07	-06	07	14	07	77
51	-15	03	09	02	11	-03	-16	71	02	-03	03	06	02	-08	00	-15	-09	-12	22	-03	-11	14	-06	05	03	-15	00	-01	-19	06	79
52	-10	04	-14	-05	-10	-10	01	67	-02	08	-05	-13	15	10	17	15	-20	01	-02	13	07	05	-15	02	-02	05	02	-13	21	15	79
53	-01	11	-04	-05	-83	-03	05	-03	-11	13	-15	00	02	10	07	-08	00	-05	05	03	01	05	-09	05	-01	-11	03	-03	-06	-04	82
54	-11	-01	-12	10	-85	04	10	06	-05	01	-01	00	-06	02	-01	09	-15	-02	-04	-10	-10	-14	07	-02	-04	03	-08	02	-16	04	90
55	02	04	-07	00	-30	-01	-14	05	-10	05	10	05	-05	00	11	00	-10	-06	-05	-05	-09	07	-02	03	07	-11	09	10	-74	-05	77
56	-26	-05	03	-02	08	-69	-03	06	05	-23	03	12	00	-01	01	16	-08	-03	-04	-02	10	07	-19	09	04	-20	-05	08	09	-04	79
57	-03	-13	-09	03	15	-54	-15	29	-18	02	-08	01	02	-03	13	02	-01	-06	-15	-23	18	17	-22	-16	-01	-07	-25	10	00	12	81
58	-09	02	-08	06	-06	-23	-06	09	-11	08	25	01	08	00	12	-07	04	-03	02	-15	41	54	-01	-02	08	-01	-09	-07	-20	-08	74
59	-14	-02	-05	12	15	-40	02	14	-06	12	-17	00	05	02	-09	-04	-01	18	-04	-22	-02	05	-06	-08	-06	-21	-06	57	-13	08	80
60	-09	-06	-09	09	00	-24	-10	10	-24	-06	05	-06	08	03	04	-04	-02	18	-11	-11	19	10	-67	07	07	-14	01	-06	-15	06	80
61	10	07	-24	-08	-02	-30	-20	12	01	10	-06	13	-09	-09	04	-13	06	-03	-02	11	11	14	-37	-17	06	-16	-19	05	10	-44	78
62	-31	22	-27	06	02	-06	-39	-07	-01	11	-17	26	04	-23	14	00	02	14	-09	-06	-25	19	-02	-07	-16	07	05	-04	-08	14	75
63	-28	-16	-17	-01	10	11	-09	-03	-16	13	-03	-48	37	-21	13	10	-02	-13	-11	-07	-13	08	-14	-12	06	-13	05	05	06	-12	78
64	-10	-09	-75	-17	-10	-12	05	13	02	01	-08	02	-15	02	04	05	-12	-11	-05	-15	06	01	03	-02	-03	-01	12	-05	-01	06	76
65	-50	01	-02	12	-05	-11	-08	10	-30	08	-15	18	10	19	04	08	23	-15	-03	12	03	00	09	-07	22	04	-13	-05	02	-09	68
66	-31	06	-24	00	10	-03	-58	23	-21	-11	02	-02	-07	07	08	03	-05	-05	04	-06	-28	20	01	04	-05	-04	-02	04	-05	-05	77
67	-59	-03	-22	05	08	-24	-05	20	00	02	-04	-20	06	-01	06	-17	-14	14	-01	08	09	22	-06	-20	-05	-19	-06	-19	00	11	82
68	-40	-05	02	-05	00	03	-41	-06	-01	07	17	-30	10	01	14	14	-11	-17	00	-04	17	10	05	11	14	-10	-02	38	-05	-02	79
69	-19	12	-24	-05	-07	-07	-10	07	-05	15	12	-08	05	00	08	05	-34	-11	-09	08	-01	41	-05	-10	16	-15	34	21	-08	15	76
70	-35	-07	-14	-15	-13	-17	06	08	-03	09	16	-12	-05	-08	04	-06	-63	09	-04	-05	-02	13	-02	07	-16	-06	03	-16	-02	-04	79
71	-08	-01	-17	11	02	-20	05	48	-07	-11	-01	-07	-08	13	07	-06	-23	10	-02	10	-01	49	08	-04	-21	-06	16	-06	06	-02	77
72	-28	-24	-39	03	05	-05	12	09	03	06	-17	-04	06	-11	-10	05	-27	00	-09	-01	06	-06	16	23	-02	-11	06	-41	08	-23	78
73	-34	03	-11	-10	12	-10	31	-03	06	20	08	-01	14	35	-12	-05	-15	09	06	-38	-05	12	09	-30	-14	02	09	00	-14	-07	82
74	-09	-12	-11	07	-14	-69	-01	09	-15	-10	-06	-04	-03	13	07	-14	-11	-02	-11	31	09	05	-17	-07	09	08	13	-08	-04	08	83
75	00	01	-22	-05	07	05	15	14	11	14	-03	28	-17	-01	-10	15	-63	-05	01	-06	05	06	-03	20	18	12	-08	08	-03	06	79
76	-07	15	-07	-13	-13	-11	-05	06	-07	-06	-02	09	07	07	06	-06	-72	-14	05	-02	07	12	06	-22	04	07	07	01	-14	02	77
77	-44	-12	-06	12	04	-12	-17	03	-02	24	-08	-14	-13	04	04	02	-10	-16	21	-27	03	29	-30	09	-25	02	10	02	14	00	80
78	-47	-15	-04	-06	-20	-18	-23	25	-04	-12	-15	01	-09	00	18	11	-05	10	16	-25	12	-02	-08	19	02	11	-29	-06	-01	-10	80
79	-22	-11	06	-10	11	-04	-08	20	11	07	00	-16	-09	11	01	04	-09	-06	05	-05	-05	68	02	12	02	-04	07	02	-01	-04	71
80	-65	05	-07	-09	-12	-24	-13	-03	-21	03	03	-12	01	-01	-08	-05	-01	03	-01	-07	06	18	12	02	-07	-04	06	19	04	11	72
81	-20	-01	-12	-18	06	-04	00	15	-22	14	-11	20	-08	-11	-07	-16	-29	07	-13	-05	05	55	-16	00	-10	01	-08	13	06	18	79
82	-12	-08	-56	-13	-12	01	-03	-08	03	02	-11	-31	-01	07	00	-06	07	23	-23	05	-03	03	-04	-05	00	15	-12	-02	-09	-06	66
83	-02	06	-77	-10	00	-01	-22	-06	-16	-12	08	-10	01	10	14	-09	04	-03	10	09	-02	-07	03	11	-06	05	04	03	01	-05	60
84	02	-11	-64	-07	05	-04	-02	14	-08	02	-01	-06	-07	21	-08	-10	-35	-08	-11	-05	10	-10	-07	-07	07	04	-11	-09	-09	-19	76
85	-48	-13	-31	-04	-14	00	-29	-03	-04	05	-04	-07	11	-08	-11	-10	-31	20	03	12	-06	18	-13	15	-15	09	03	05	12	-05	78
86	-02	02	04	-10	-09	-33	-25	10	03	-02	03	-11	15	02	-02	03	00	-18	02	-06	-08	-10	-63	-10	-01	02	05	13	04	-17	75
87	-05	-11	-65	-14	06	-08	-05	-03	09	16	12	02	10	-16	-05	25	-17	08	07	03	-08	16	02	03	-10	-10	-09	01	02	-08	73
88	-07	06	-07	00	-03	-83	-04	08	07	11	-03	-01	-14	-03	05	-03	-01	00	10	-08	-06	07	-02	04	-07	01	-02	01	-02	05	79
89	-21	-09	-19	-15	05	-35	-12	18	-02	-06	03	-33	12	-01	17	-31	-13	07	-12	-09	00	-02	-05	14	19	-13	-12	40	-10	-12	85
90	-69	-19	02	-17	-09	-04	-13	27	-05	-01	08	-17	-14	-03	17	-04	-10	00	02	-06	-02	05	-16	02	-04	-06	-08	03	-08	02	79
91	-51	-18	05	-07	13	04	-35	32	-14	-05	-08	-02	-02	-05	01	-08	-12	-08	-07	-06	-04	18	-10	01	01	-11	-01	-04	-02	-13	69
92	09	-22	-05	-11	04	04	-02	04	-03	06	-15	-15	06	01	-02	03	-02	04	06	-08	12	04	-02	-01	-04	02	75	-05	-03	-05	74
93	-05	-30	05	-10	14	11	08	20	16	05	01	05	34	-07	-07	-18	-05	-27	23	06	-18	-19	-17	02	-21	-17	-05	-26	-11	14	78
94	-13	-63	08	-02	18	02	02	-08	02	-10	-04	16	-07	11	-01	-03	04	02	-17	-09	05	-01	-31	21	05	00	24	-02	02	-05	75
95	-14	47	21	03	15	19	19	00	01	-09	-21	-03	-04	02	-05	-05	06	-07	-14	-10	-02	12	-26	-39	-03	04	-05	15	10	-04	75
96	04	-11	-01	04	12	05	-01	04	05	05	79	-00	-02	03	05	08	-05	03	05	06	05	01	-02	02	03	-03	-10	-01	-03	00	70

Note: Decimal points omitted.

Table 11

Rotated Factor Matrix for Problem II

	Factor																														
Var.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	h^2
1	-04	-05	-12	02	-10	06	09	-14	-73	-20	-03	-02	-27	03	08	-08	05	-01	06	01	01	00	11	-04	-02	-03	-10	-06	-09	11	78
2	-27	-13	06	-06	09	-15	07	-09	-74	06	05	04	06	07	-10	02	-07	-03	01	-12	02	00	05	-02	-03	03	06	04	09	-03	76
3	-20	-02	-15	-04	13	-14	00	07	-50	01	12	-12	-22	-20	-07	-03	-20	07	-10	21	-02	10	-10	19	-17	10	04	20	00	-05	72
4	07	-09	-14	07	34	-15	08	-01	-26	07	-04	-03	-53	03	-15	06	10	-12	-15	17	-01	14	-09	-13	13	06	-02	08	-09	-03	72
5	-18	-03	15	-13	07	-24	00	-07	-39	-07	22	38	11	15	-09	-02	05	13	-19	-03	-01	-10	-04	-03	12	-12	18	-10	-13	-14	71
6	-06	-06	-05	-11	05	08	-08	07	01	10	-03	-01	03	03	02	-02	07	-80	03	02	03	01	11	02	09	04	-04	00	-01	10	74
7	-04	-10	08	02	01	-04	04	07	-03	00	09	08	02	-01	00	-16	00	03	00	03	-09	-04	04	-82	-01	01	-12	-01	-09	-01	77
8	03	-55	-10	-27	09	-17	-08	-06	-17	06	03	18	-10	14	-16	-03	-06	-06	06	-24	-01	09	06	-05	21	-19	-09	-05	14	11	76
9	-08	-02	-09	03	-04	-09	03	-09	06	03	06	00	-03	03	00	-03	-01	-06	-06	00	-11	-06	-09	00	83	01	03	02	03	00	77
10	-19	-12	-01	-08	06	-32	18	01	00	-22	14	18	-15	-03	-13	-04	03	-15	09	-20	-09	05	02	05	04	58	05	00	04	05	76
11	-19	-08	-06	-01	-11	-04	00	-06	-02	02	-03	13	03	04	-77	00	-12	-01	-03	-09	-10	00	-05	00	06	05	-14	01	-02	15	76
12	00	-53	-37	11	04	-08	13	-23	04	-10	-06	11	-13	11	07	02	13	-07	-25	-14	-13	18	07	-01	-11	19	-07	-08	07	18	83
13	-15	-21	-18	-14	-17	-30	13	-28	-15	-25	-03	03	10	-04	-02	04	-13	-07	-13	-22	14	-10	-04	-21	03	13	02	05	-32	04	71
14	-10	12	-04	-11	08	08	05	-03	-05	01	-06	01	01	10	-07	06	-74	13	20	-02	06	02	03	00	03	00	-16	-03	-03	-02	72
15	-01	05	-08	-01	-03	-07	08	02	-05	-04	-03	11	-14	86	00	-08	-08	-02	-03	01	-04	-10	06	00	03	-01	-03	03	-10	03	85
16	-11	-79	07	05	02	-02	02	-03	-06	-03	-11	03	08	-06	-04	-05	17	-05	00	04	-04	-15	07	00	-15	12	-03	03	-13	08	80
17	-03	-84	-04	00	-12	10	-03	-17	-08	07	-02	-03	01	-04	-14	03	02	-04	-01	04	-06	-09	03	-01	05	01	-05	-03	-01	04	82
18	-14	-76	-16	-01	-08	-01	-10	-03	01	-06	05	14	-10	-18	-08	06	-12	05	06	21	07	00	09	-04	-07	-02	10	07	-02	-01	83
19	-26	-14	-12	-15	00	-17	02	05	02	13	-08	04	-21	21	-09	06	-01	-02	11	-05	02	-08	-01	-18	-09	-04	11	-10	-62	-01	75
20	-37	01	-02	-06	11	00	03	-33	05	11	15	-07	-08	-01	01	04	-09	03	-01	-53	-13	-06	14	-12	-02	06	-15	12	-12	-02	72
21	-12	02	03	-20	-14	-03	10	-03	-11	-09	-07	11	-72	21	05	-18	01	14	04	-13	03	00	10	10	00	06	-04	06	-07	02	79
22	-23	-05	-01	-15	-08	-06	-15	-11	-04	-01	00	-06	-13	10	-04	-69	03	-02	-05	05	09	00	11	-21	-01	-05	01	06	09	07	74
23	-02	-06	00	04	-01	-07	01	-04	01	01	-03	02	-01	03	-08	-01	-10	-02	-03	01	02	-04	-06	-11	-01	-03	-87	-02	05	-01	81
24	07	-36	01	-06	11	03	11	-05	-06	00	27	12	-01	05	01	-49	07	00	23	-04	-06	14	-07	-10	16	14	-08	14	-16	-13	71
25	-37	-42	-22	-17	11	-28	-03	-08	-10	09	18	15	07	10	03	02	05	-02	-09	-13	00	-11	09	-11	13	-16	-14	18	04	-03	73
26	-25	-16	07	-19	-01	-05	-14	-23	-06	-24	-28	08	07	17	-20	-06	02	13	03	-24	-11	04	35	-28	05	23	-06	05	-04	-14	80
27	-24	-11	-11	07	-14	-15	07	-08	-08	-13	-10	32	-13	04	-07	-04	29	-09	03	-56	00	17	-05	-15	-01	-14	12	03	-01	-02	79
28	-33	-22	-10	-13	-15	-19	-22	-19	-06	-20	-05	05	04	13	-10	-09	04	-12	-01	-17	-11	21	47	-15	21	07	03	05	-19	-01	85
29	-44	-14	-15	-08	-11	-07	-17	-27	-11	-10	14	-08	-02	22	-14	-08	12	-22	-19	-09	-05	28	29	03	09	06	08	01	-13	07	81
30	-27	-47	04	-18	04	-07	-11	-30	02	-04	02	-04	-05	14	-10	-07	-01	-08	08	00	-07	18	02	-14	25	15	01	-08	-17	-17	69
31	-01	-13	10	-12	04	-13	-01	-04	02	05	-03	-01	02	05	-04	03	06	06	14	-05	-80	09	00	-10	12	04	01	02	02	-04	77
32	-10	-26	-06	-08	-02	05	02	-15	17	07	26	53	-07	13	-12	-11	34	05	-06	-05	05	-06	00	-01	-04	00	-07	16	-19	01	74
33	00	01	-51	-08	-05	-07	14	-10	-07	05	-06	17	-03	-21	09	-07	00	06	-03	-09	-05	17	-04	06	10	24	-12	32	-08	10	65
34	01	-05	02	02	-06	02	-04	05	02	04	-04	-02	-03	02	-01	00	10	05	-79	02	09	-03	-01	-01	05	-03	-03	04	04	00	67
35	-23	-17	05	-06	04	02	07	00	06	-13	09	07	-03	09	-07	29	05	-30	09	01	10	-10	-02	-37	09	-04	-02	33	-10	17	65
36	-06	-17	03	09	08	-05	17	03	-08	-03	-04	06	-05	04	05	-04	-03	-13	00	-04	04	-13	78	-01	-15	-01	07	02	04	06	78
37	-31	-08	00	-22	05	-12	18	-12	06	-05	-14	03	-03	02	04	-07	08	-13	-03	59	03	05	-07	-25	-02	-19	-05	03	-01	02	73
38	-16	-07	-02	-17	08	-55	19	00	-14	-24	06	00	20	22	00	-01	-01	-06	-11	-07	09	-06	14	-14	11	06	16	27	-10	06	78
39	00	-25	-41	11	15	-08	16	-63	-08	-02	-03	-02	-06	14	07	01	06	01	-08	-04	00	-09	00	14	-11	03	-15	10	-06	12	84
40	-02	-10	-35	-01	13	-15	05	-55	-03	-12	10	10	-23	26	08	09	-08	-11	-09	-08	-10	03	-06	00	-16	13	-25	-03	-02	08	81
41	-11	-48	-11	01	09	09	-08	-17	15	-03	-14	-20	05	04	20	-11	16	00	-08	-05	-17	00	00	-39	15	03	-05	12	09	-05	71
42	-11	-16	-20	-10	12	01	-12	-37	-06	12	03	-23	-36	-04	-07	03	09	-22	-26	-11	09	-07	01	-31	00	-03	13	06	-01	-03	73
43	02	-61	-06	-04	11	00	02	-31	-03	11	07	06	02	04	06	-14	08	00	-19	-09	00	23	05	-15	08	-05	02	01	01	04	68
44	-03	-18	-03	-25	20	07	13	-47	-26	14	02	-09	-02	-17	01	-07	29	01	06	-03	-05	03	17	-09	24	05	-02	14	-10	02	73
45	-07	-13	-15	-07	-08	-03	07	-76	00	-03	02	04	13	-07	-24	-06	-01	05	-02	-01	11	02	-03	03	06	08	01	-14	14	-08	81
46	-14	-10	-11	12	11	02	07	-71	-02	-08	-25	17	02	-06	07	-04	-20	-10	12	06	-14	-08	-08	16	19	-06	12	00	-09	07	87
47	-04	-39	14	07	34	-01	-08	-45	-10	07	18	-02	-19	00	-04	13	04	02	01	03	-16	-12	02	-10	03	-09	-03	-02	-11	-03	68
48	05	-17	-02	10	01	-14	-07	-56	-13	21	-04	-05	-12	-12	-03	-01	-04	25	07	-11	06	14	14	-30	07	-14	11	18	13	18	80
49	-22	-27	-18	-05	05	05	-11	-56	-02	-02	-04	14	01	06	07	-21	19	23	17	00	-01	04	08	04	-01	-09	-05	-14	-04	19	75
50	-18	13	-11	-18	-05	-64	-07	-17	-20	04	-14	10	-11	-03	01	00	04	17	10	-06	-12	03	04	06	04	-13	-17	09	-14	-12	77
51	-27	03	09	-07	05	-68	-11	01	02	-21	-07	10	-08	-07	09	-03	08	12	14	-08	-01	05	03	-15	01	13	-21	03	-02	00	78
52	-15	03	-15	-14	17	-69	12	-05	-01	25	02	03	-03	12	-10	02	15	-03	-04	17	-13	07	04	10	-04	04	04	-07	04	05	7[illegible]
53	01	10	-04	-06	00	04	83	-10	-11	-08	14	06	-09	12	-01	-05	02	01	06	02	03	06	12	-08	01	06	-04	-04	04	03	82
54	-07	00	-10	06	12	-05	84	-01	-03	-17	02	-13	00	-03	02	12	-07	06	-01	02	-03	-04	-01	06	02	-01	04	02	-06	-10	84
55	-05	04	-05	-01	12	-02	28	03	-07	-80	-10	03	-03	06	00	01	00	08	05	02	04	02	06	-01	-04	04	02	10	05	05	80
56	-25	-03	01	-77	06	-04	-07	00	04	05	-03	07	-12	-02	09	-05	02	-09	04	-08	00	-02	-20	18	-04	00	01	08	-07	-02	80
57	-13	-13	-08	-61	-02	-29	-20	03	-15	-07	11	09	-09	-02	-02	16	-01	-20	07	16	-09	-04	08	-06	02	11	15	20	03	-22	83
58	-08	-04	-04	-26	-02	-15	05	-05	-12	-28	-19	45	04	-06	-02	02	-04	-41	07	09	10	-14	14	-09	-05	07	04	-08	12	-10	72
59	-13	00	-03	-37	-02	-10	-09	15	-04	-12	14	04	-13	02	-04	-13	01	02	-11	-06	-05	-22	06	-02	05	02	05	66	14	-05	80
60	-16	-04	-08	-50	02	-03	01	08	-30	-10	-15	03	-08	14	-14	16	30	-13	-10	01	04	09	-01	-14	-03	31	14	03	07	15	78
61	-02	10	-25	-45	-03	-07	-05	-12	02	06	02	08	-06	02	13	-06	00	-05	05	09	41	23	19	-10	-02	34	-04	05	-03	-15	75
62	-41	23	-28	-09	-01	11	-10	-02	-02	-20	24	15	05	-17	19	12	04	20	-22	13	-25	08	23	-06	18	-02	09	-02	-03	01	80
63	-27	-12	-16	06	02	03	-07	00	-13	06	09	12	-21	-27	-48	00	28	12	06	21	12	-07	19	04	-10	02	15	06	-16	06	78
64	-08	-11	-74	-09	14	-13	12	-13	02	00	09	-04	-03	00	04	09	-14	-09	09	01	-03	-14	-03	00	01	00	05	05	-04	13	74
65	-44	04	-02	-09	-23	-09	09	10	-29	08	16	03	05	08	21	-15	-03	-03	08	06	-01	-10	10	07	-29	-06	08	-09	-11	-09	64
66	-49	05	-23	-04	03	-23	-18	-09	-22	-25	03	16	07	09	-02	-05	-12	20	-04	01	00	18	10	03	13	-02	-03	04	-33	-06	78
67	-51	-04	-22	-27	13	-19	-04	13	-03	04	03	15	-08	-09	-16	-25	01	-01	-12	09	-09	-28	04	-06	06	24	03	-19	-01	-03	80
68	-50	-02	00	02	10	09	-03	-10	-02	-17	-13	13	-07	02	-35	-14	09	-23	17	-02	-05	10	20	15	-14	-15	02	24	-14	-06	78
69	-11	15	-24	-09	39	-10	-01	-08	-06	-25	-05	34	-11	-05	-15	-10	02	-04	02	09	-18	-06	23	13	-18	12	02	06	-09	22	72
70	-30	-10	-16	-15	65	-11	19	-06	-04	02	-20	11	-08	-11	-09	-04	-07	03	-05	-03	03	-19	04	-06	15	-03	04	-13	02	08	80
71	-05	-02	-15	-14	23	-54	-04	09	-07	00	04	38	-07	05	-04	-14	-22	-08	-14	07	-02	-14	-09	-03	18	11	06	-09	-04	08	75
72	-22	-28	-42	-02	24	-08	01	07	04	11	15	01	-10	-16	00	-02	06	02	05	-19	24	-13	-06	08	04	-13	10	-34	08	13	75
73	-09	04	-08	-04	16	02	-02	-03	01	01	-02	11	04	13	-01	04	04	-03	-03	00	06	-83	08	-05	06	-03	-04	09	-04	06	81
74	02	-12	-10	-68	15	-15	16	10	-17	00	06	-01	14	05	-03	-30	-06	-08	-05	11	-12	02	-06	-02	-08	09	06	-12	-18	10	82
75	-01	-03	-22	02	64	-09	-02	00	09	06	-08	07	10	04	27	19	-13	02	07	-15	00	02	04	06	-19	-04	03	14	19	01	75
76	-03	14	-06	-07	72	-09	08	-19	-04	-23	11	05	01	01	06	-06	01	-11	11	15	-05	-13	-02	-01	-02	04	-06	-04	-11	-06	76
77	-52	-07	-09	-21	10	03	-02	12	-08	15	-01	30	05	06	-18	16	-01	-05	15	01	03	-08	23	-05	28	04	-22	12	-05	22	82
78	-66	-17	-07	-24	02	-19	19	-05	-05	-05	13	-01	08	08	-03	19	00	-13	-04	03	15	08	-14	-01	04	-10	-13	03	10	-20	83
79	-26	-08	05	-04	13	-21	-11	-04	06	-03	-06	69	-05	11	-16	09	-09	00	06	-06	03	-07	05	-02	-02	05	-07	-01	-01	08	72
80	-53	07	-08	-17	04	03	14	-11	-21	05	00	21	-12	-12	-10	-17	-13	-15	-11	-15	-25	-22	05	-05	01	-11	04	13	-13	01	75
81	-19	-02	-14	-10	34	-13	-07	-12	-29	06	-01	49	05	-05	16	01	-05	-01	-04	-01	-18	-05	08	-18	11	24	11	18	22	-01	82
82	-11	-07	-53	01	-09	07	13	-19	05	-03	06	06	13	08	-32	-07	-04	05	-17	05	06	-12	-02	-07	-01	06	33	-10	17	-06	73
83	-06	06	-77	-01	-06	02	-02	-18	-14	-08	-04	-08	01	11	-12	-14	04	-07	02	02	04	12	-04	-06	09	-17	-06	-07	-08	00	80
84	-02	-12	-64	-06	31	-09	-06	-04	-09	-10	04	-13	02	26	-11	04	-01	-01	15	01	20	-12	-01	-09	-07	08	10	-05	05	-11	78
85	-48	-14	-31	-03	34	04	09	-08	-10	08	08	15	08	-04	-08	-13	11	04	-28	-17	-02	04	16	-04	12	09	-03	-02	-14	02	74
86	-12	08	06	-49	-02	-01	04	-25	-02	04	-06	-08	-01	08	-18	06	26	09	10	09	16	11	07	-02	08	23	-02	24	-23	05	70
87	-04	-13	-67	-07	16	00	-02	-06	11	05	-13	18	-10	-14	04	07	07	07	-12	-03	04	-03	14	24	03	02	-09	06	-05	-10	74
88	-07	01	-05	-75	01	-12	06	-01	10	-05	09	09	00	-03	-01	-06	-27	03	-03	01	-12	-11	09	-07	05	-20	-08	05	08	-02	79
89	-26	-11	-18	-34	12	-16	-04	-06	00	-17	-01	00	-13	00	-38	-24	09	-02	-05	-01	03	-02	-06	-30	-22	-11	10	34	-03	-15	84
90	-75	-14	02	-10	08	-20	11	-13	-07	-03	-13	02	-10	00	-16	-03	-05	00	05	05	-05	-16	-02	-06	-02	08	01	02	05	-02	78
91	-66	-14	03	01	07	-28	-16	-09	-15	-07	00	14	-04	-05	-01	-10	-02	04	08	-04	12	03	00	-07	03	19	10	04	-10	05	72
92	11	-21	-05	06	02	-05	-05	-17	-02	-07	20	05	-01	00	-18	-03	01	-11	-02	03	01	-08	07	00	01	00	-02	-03	00	75	77
93	-03	-31	03	03	01	-13	-08	-02	12	05	-02	-13	-13	-09	06	-06	44	27	32	-08	-11	-13	02	-15	15	12	-21	-20	04	-01	74
94	-20	-57	08	-10	-04	14	-14	-01	-04	09	-10	00	03	17	16	08	12	-02	08	-05	13	04	-14	-04	-03	09	18	04	03	43	78
95	-07	57	23	08	-02	04	-16	04	-03	20	17	06	01	-01	-02	12	04	02	08	15	06	-21	-09	-08	-01	33	11	15	-02	-01	74
96	03	-10	00	06	04	-04	-14	-05	06	-08	-79	00	-06	04	-02	04	-03	-04	-05	07	-04	-02	04	07	-05	-05	-04	-05	-04	-13	72

Note: Decimal points omitted.

Table 12

Rotated Factor Matrix for Problem III

	Factor																														
Var.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	h^2
1	-03	07	10	-05	13	03	05	-17	-17	75	10	05	-08	-11	04	05	-08	-03	00	07	-04	-07	-04	03	-07	07	24	-07	00	06	79
2	28	02	-05	02	11	07	12	-07	04	69	-01	-03	16	-03	-06	14	07	-08	-01	-07	-19	14	02	-02	07	05	-16	-02	05	09	77
3	10	04	13	11	-03	-08	02	03	11	59	-09	-10	15	17	06	12	14	15	06	-04	24	18	-04	-23	07	-05	07	18	12	-03	75
4	03	13	14	-04	-03	01	02	-07	-04	27	-05	-12	-13	-05	-06	75	-04	-04	-04	04	08	09	02	-09	-05	-01	15	06	-09	02	78
5	14	04	-13	19	20	51	-02	-07	03	35	-08	-03	-17	-01	06	-01	14	-13	19	-09	-12	13	-05	-04	-14	-04	-27	-03	-12	-02	77
6	04	01	04	07	05	00	05	10	-05	-02	03	-05	-05	04	-11	03	-01	00	-81	03	00	-07	-01	-03	-02	08	-05	05	-06	03	73
7	05	-03	-07	-03	02	08	10	-03	05	03	-01	-02	-02	-79	-16	02	13	02	04	14	-01	03	15	05	-12	03	-03	-01	01	01	76
8	00	10	12	23	01	14	54	12	-16	13	05	-04	12	-07	04	13	04	-15	-10	06	-38	19	12	-01	04	00	08	-15	-19	05	79
9	12	10	09	-01	14	00	00	-04	00	-08	-03	07	01	03	-06	10	07	-06	-07	-03	-02	07	10	08	09	-12	00	01	-83	-03	82
10	16	00	03	04	14	20	07	-18	-11	00	07	-01	02	00	-06	08	06	03	-13	-07	-12	26	06	-03	-01	01	11	69	00	12	78
11	22	-10	09	-03	02	11	13	02	-31	-01	-07	22	27	01	04	05	-01	-06	01	17	-17	05	15	-53	-04	-09	-24	11	-11	13	79
12	01	25	36	-13	20	09	49	-18	-19	-05	-15	-02	-16	05	04	17	-06	-04	-04	12	-14	03	10	13	10	03	08	24	17	-03	82
13	05	11	25	15	28	09	15	-20	-10	14	-08	16	09	-14	-27	-05	-11	03	07	06	-23	22	-09	04	-21	-01	-09	19	03	06	64
14	11	-07	07	11	01	00	-08	-01	07	07	13	-09	79	05	00	-08	-04	-10	08	15	09	-07	-03	04	-04	-06	05	03	-03	-06	78
15	-05	00	06	01	10	09	-05	-10	-05	04	-06	-01	09	-03	-05	00	-03	-85	00	04	-02	08	05	02	-12	06	13	-04	-06	04	83
16	09	21	-07	-05	-01	01	77	-03	-07	06	-02	-03	-13	-06	-04	-12	-07	01	-05	04	05	02	05	-11	-11	11	-02	11	07	03	78
17	07	27	06	02	03	00	79	02	-05	07	05	20	-03	02	-03	09	-03	05	-01	09	01	-14	06	-05	-04	05	-15	02	-07	00	83
18	08	14	19	04	03	13	75	07	-01	03	02	09	13	-07	-13	03	07	18	05	-16	15	04	-02	-13	-02	10	10	-05	08	-06	84
19	23	08	11	08	13	02	10	04	05	00	07	01	03	-08	-11	06	03	-17	-03	-06	-03	13	04	-07	-75	-02	11	02	10	06	78
20	35	25	04	09	31	-15	-09	-09	-01	-02	09	-08	05	02	-15	-05	14	01	15	25	-40	-05	17	02	-04	14	-01	07	06	07	71
21	11	09	-04	14	02	03	-03	-10	01	16	03	14	04	01	07	18	-03	-26	11	00	-13	04	00	-11	-14	10	68	12	00	08	76
22	19	09	00	26	25	-12	02	13	-10	05	02	13	-16	-49	23	08	04	-18	-06	00	-04	08	-23	-19	18	07	15	-01	04	-03	76
23	05	-04	00	-02	-05	00	09	00	-06	-03	-01	02	11	-13	-02	02	-05	-02	-03	86	02	08	-04	01	04	-04	01	-05	01	-04	81
24	-12	10	-03	14	14	06	33	-11	14	02	22	-13	-09	-23	18	03	37	-12	-01	13	00	-07	00	-17	00	-10	08	25	-17	01	68
25	32	10	23	25	17	11	38	05	05	12	-06	-11	-11	-07	-24	-01	19	-12	-01	15	-17	27	04	02	02	12	-07	-09	-09	-04	73
26	14	09	-04	05	41	12	16	04	03	03	05	00	11	-34	-06	-10	-33	-11	16	02	-23	05	21	-12	01	18	-03	12	01	33	80
27	12	10	09	-09	20	22	09	-08	04	07	02	10	-20	-10	-07	-03	-06	-01	-06	-07	-67	14	00	-13	00	-09	15	08	02	-05	76
28	08	03	08	08	70	06	23	10	-02	04	03	10	05	-17	-06	01	-08	-02	-09	-04	-17	19	11	-11	-07	27	03	05	-13	17	86
29	19	18	14	03	70	-04	12	05	-13	13	-08	12	-09	04	00	-02	06	-17	-21	-05	-08	09	02	-16	01	05	-06	06	00	13	80
30	16	25	-02	19	49	07	38	-01	09	-05	26	09	02	-10	03	29	-04	-06	-04	00	-01	01	01	03	-12	-06	-16	12	-11	11	78
31	02	00	-10	11	09	-03	11	01	03	-04	10	-05	-03	-12	06	03	-01	-04	02	-04	-03	13	85	-01	-01	-04	02	04	-09	-07	85
32	06	24	06	04	05	43	21	-01	01	-21	-05	02	-25	-06	-02	-03	37	-09	01	13	-14	-04	-01	-29	-15	09	10	02	03	12	74
33	-08	13	51	07	08	05	-04	-07	-03	11	-07	-04	01	05	00	-10	11	25	-01	15	-11	07	13	-04	14	01	25	18	-11	20	63
34	03	13	-03	-01	02	-04	04	04	01	-04	-79	09	-10	-02	01	05	-04	-04	04	02	02	-03	-08	04	04	00	-02	-02	-04	-03	70
35	13	02	-05	05	08	06	17	-09	-11	-06	01	-05	02	-15	-69	08	08	-04	-21	04	-02	-02	-05	-08	-10	-01	-04	01	-03	10	68
36	08	-07	-03	-04	14	07	16	-14	-06	07	-02	-09	-06	-04	-02	-01	-08	-07	-15	-05	-01	04	-05	-02	04	78	08	00	14	-03	78
37	25	09	-01	14	09	10	13	-22	01	-02	-01	00	-07	-24	-14	10	-17	-01	-18	03	47	22	-02	-09	05	-24	05	-30	08	06	77
38	-02	01	04	21	23	07	04	-21	-04	15	-17	-11	02	-14	-31	-12	-02	-20	-01	-13	-09	53	-07	-05	-06	09	-10	18	-12	08	77
39	-04	59	43	-10	13	00	16	-23	-15	07	02	-12	00	15	-02	08	-05	-10	09	21	-05	07	01	-04	01	10	01	-03	11	00	81
40	-02	41	38	01	25	15	02	-17	-16	05	06	-08	02	12	-05	22	-02	-21	01	35	-06	08	07	06	03	-05	04	14	24	-02	80
41	08	29	09	05	22	-21	42	03	09	-16	03	-06	-18	-36	-14	12	-15	00	04	03	-03	-11	11	17	19	02	-08	02	-07	00	74
42	07	67	14	-01	22	13	20	02	-12	11	-15	-16	-09	-13	-08	-02	10	02	-11	02	-02	04	09	08	-16	-15	01	04	06	07	79
43	-04	48	-08	-02	19	00	63	07	04	01	-11	-08	-05	-07	-05	-10	-03	-10	03	22	01	00	02	-06	04	-01	-12	07	-10	00	81
44	00	64	20	04	07	05	-05	-12	-26	01	02	-07	02	-04	-04	-13	02	-17	-05	-13	01	-05	03	-15	07	09	22	-24	13	22	83
45	06	79	21	-03	-11	-03	10	02	03	-04	-11	-02	02	-12	00	13	04	06	00	-01	-10	-01	-03	-05	-11	00	-06	-05	-04	-09	79
46	00	74	-13	-13	-01	06	12	10	17	-02	00	-06	12	00	12	06	03	15	-02	-06	07	05	-09	03	-12	08	06	-08	-12	13	79
47	16	65	-02	04	01	-14	18	08	06	-11	04	-15	06	12	08	10	01	-24	08	08	-11	09	03	-10	20	03	17	08	-12	-02	78
48	04	81	-03	20	07	03	27	06	-10	-02	03	03	-12	13	-09	-01	-02	-04	01	-04	03	-01	00	07	04	-05	-07	02	01	04	86
49	05	77	14	01	02	-01	28	11	02	20	-03	03	-14	-07	-03	-02	-03	10	-03	-06	-03	05	00	01	05	-12	01	16	-08	-06	85
50	11	05	12	25	19	15	-15	07	08	19	19	10	-06	09	02	13	-15	03	22	20	-13	60	09	-03	-09	06	06	-07	-01	-02	81
51	12	05	-12	04	15	10	-03	06	01	00	12	-14	-01	-20	-09	-09	-10	10	11	13	-10	72	04	01	-04	-03	20	15	-01	07	82
52	21	04	15	07	-01	03	-01	-07	-03	01	-04	-10	-12	14	17	13	07	-15	-09	-01	11	72	17	-04	-02	02	-11	02	01	11	80
53	05	-04	06	-02	-06	07	-08	-83	-03	09	01	03	01	-08	04	06	16	-12	-02	04	-03	-02	01	04	04	09	11	02	01	13	82
54	10	-08	12	-00	-10	-12	00	-85	10	05	02	-12	02	10	-08	02	02	02	10	-03	01	03	02	02	-04	04	-07	06	-04	-07	85
55	-14	-16	04	06	17	07	02	-46	-13	12	09	-24	01	-07	-17	-15	-37	-04	16	-09	03	04	-18	-17	16	-07	16	20	-01	-02	78
56	23	08	-02	68	03	02	03	09	09	-02	-01	-10	01	16	-03	-04	00	01	-15	-02	-06	05	03	-00	-14	-26	24	02	08	22	80
57	06	00	10	56	12	21	11	15	17	18	09	02	-01	01	-25	10	01	04	-15	-17	19	25	15	-02	-03	02	-02	08	00	27	82
58	03	04	07	18	01	59	03	-09	04	12	04	00	03	-10	-11	-16	-31	07	-41	-04	02	11	-07	-08	01	11	05	10	-02	11	79
59	04	02	01	56	00	-01	-04	12	08	09	-11	-05	-09	-07	-37	-03	10	-07	09	-04	-05	07	03	-29	20	20	13	16	-10	05	76
60	13	-01	07	21	02	10	08	-03	-07	28	-16	-03	-17	-05	-13	02	-14	-07	-18	-14	-04	05	06	-05	-01	-17	04	17	03	60	75
61	-01	06	28	23	17	06	-10	04	20	-03	-01	05	12	-11	02	05	10	-01	-12	-01	08	12	-28	14	10	06	21	10	13	54	77
62	32	-09	25	10	46	14	-19	00	-02	02	-16	-07	-14	01	-10	-15	10	16	21	-12	19	-09	13	11	17	-01	13	-07	-10	-06	77
63	31	-05	18	-12	01	10	15	11	-10	13	06	08	-26	07	00	11	10	18	09	-08	14	-03	-08	-55	-13	10	04	06	02	15	75
64	09	21	75	12	-04	-03	06	-11	-12	02	11	-12	15	06	-14	-03	04	01	-08	-04	06	14	05	04	-09	04	00	04	-03	-07	79
65	34	-05	-01	13	12	00	-02	-05	20	38	12	13	-12	07	06	-40	13	-19	-08	-03	13	11	-10	03	-08	04	08	03	20	-10	72
66	20	-05	22	02	59	17	-01	10	06	24	-08	-13	11	00	-06	-14	-01	-04	20	06	05	24	-03	-16	-20	-14	15	-03	-09	03	83
67	62	03	21	24	01	17	01	08	02	05	-12	-05	-04	-20	15	-07	-02	00	-08	-03	15	19	03	-13	-16	03	05	28	-11	05	82
68	29	04	-03	-01	34	07	03	-02	04	04	13	-08	01	08	-10	-01	-12	-02	-21	-01	-07	-02	03	-67	-02	05	15	-08	10	02	80
69	15	08	21	07	10	33	-15	-08	-37	06	03	-38	02	00	07	-02	-09	03	00	-08	12	10	14	-28	03	14	23	08	14	07	76
70	47	12	14	13	-07	11	09	-17	-05	00	-09	-55	07	-05	06	23	-15	06	00	-01	-04	08	-03	-07	-13	07	-04	01	-17	03	79
71	16	01	15	24	-02	46	-02	03	-18	03	-09	-14	13	-09	09	15	03	-08	01	-04	04	46	-07	09	-04	01	-03	14	-19	-08	74
72	38	13	40	00	-17	-05	25	04	-11	-03	05	-17	-05	04	14	04	13	12	-08	-14	-22	11	-26	11	-16	-03	02	-03	-05	-13	74
73	29	26	10	15	-30	12	-13	06	-12	-01	01	-14	-11	-04	-30	-21	-16	-28	10	12	10	-09	-10	-05	-15	28	-12	04	-22	-06	81
74	04	-04	09	64	03	03	13	-15	-14	15	-04	-13	02	-17	31	-07	07	-08	-17	-09	09	13	04	06	-16	-06	-08	10	06	20	82
75	04	12	21	00	-14	00	01	06	09	-06	04	-70	08	16	-10	-04	-01	-03	-01	-03	-11	12	08	13	18	06	-03	-06	20	-04	77
76	04	17	05	09	04	11	-20	-19	-06	05	15	-70	02	-12	00	12	-02	-02	-08	05	22	08	00	-06	-10	00	-08	04	-04	-02	77
77	54	-18	08	08	12	21	15	08	-16	02	07	-11	12	02	-24	-03	13	-04	-13	16	-06	04	09	-09	-01	16	10	-19	-23	32	86
78	47	02	06	16	20	02	18	-22	26	11	-04	-03	03	10	-24	-07	07	-02	-17	11	-05	29	-10	-06	03	-26	-08	-08	01	07	76
79	32	-08	-03	04	09	66	12	11	-14	-13	12	-11	08	07	-10	07	00	-14	06	10	-14	16	-01	-11	01	00	06	08	11	-02	79
80	58	13	04	31	18	14	-12	-12	-01	21	-05	02	06	-03	-09	-02	03	01	-06	03	-11	-07	15	-22	-07	10	06	03	-03	-16	74
81	28	16	13	09	07	46	-01	11	08	25	-02	-34	00	-10	-10	10	07	03	02	-07	-03	07	18	10	31	09	-01	22	-05	09	80
82	17	04	57	-03	03	10	07	-16	-03	-04	-18	16	01	-07	04	01	03	-11	11	-24	00	-11	-07	-15	06	-07	-29	06	02	05	69
83	-03	09	74	-01	22	-03	-05	-05	-03	13	03	05	00	-10	11	03	-03	-07	-08	05	-05	00	-07	-13	-05	-13	01	-20	-11	-01	76
84	06	00	66	06	-01	-07	10	01	03	08	16	-38	02	-12	-06	14	-07	-25	-02	-11	00	04	-18	01	-07	-02	-19	09	09	07	78
85	47	10	28	01	35	11	11	-08	02	07	-24	-30	-12	-04	09	08	17	10	01	11	-16	-06	-02	-10	-10	10	-04	06	-13	08	78
86	03	12	-05	27	18	-05	-05	-09	-01	-03	16	03	-06	03	-04	03	06	01	08	02	04	08	-06	-17	-09	00	-03	-03	-03	73	77
87	10	03	67	06	06	11	13	08	10	-13	-12	-19	-10	27	06	09	-08	15	05	13	-02	-03	-01	-04	-03	14	14	01	-05	04	77
88	12	-03	06	83	04	12	00	-05	-02	-08	06	01	15	-02	-02	-02	-02	02	06	08	03	08	03	05	04	05	-02	-09	-04	08	81
89	16	09	21	39	09	-01	10	-01	09	03	-09	-05	-04	-36	-18	12	-06	-05	04	-08	-11	17	-08	-54	-03	-11	02	01	21	09	85
90	70	12	-02	07	18	07	13	-14	04	10	06	00	09	-08	-12	05	-11	01	03	-01	01	26	01	-20	-02	-03	00	02	03	07	76
91	49	12	-07	-03	35	13	15	13	05	16	10	-11	05	-06	-07	-06	06	04	06	-07	-02	31	-18	-12	-09	-04	07	16	-01	09	71
92	-04	08	07	-04	03	05	20	04	-79	02	01	02	-06	04	-08	05	11	-05	-06	08	00	01	-06	-02	02	05	-02	05	-01	-03	73
93	13	11	-03	-13	-10	-15	32	11	00	-13	38	00	-39	-17	11	-05	-08	03	22	18	-03	15	09	11	-04	-08	12	12	-20	13	79
94	16	18	-12	-03	04	-06	57	18	-21	03	02	00	-07	04	-19	02	03	-10	-08	-18	-10	-11	-10	18	-02	-17	07	02	13	18	72
95	15	-05	-20	-13	-15	06	-58	21	03	04	09	08	-03	-02	-21	-01	17	-04	07	-06	22	-06	-01	01	03	00	-10	17	01	20	72
96	-03	-02	00	-04	01	01	12	13	12	-08	-03	-05	-01	09	10	07	-77	-06	-04	09	-01	02	03	-05	-01	06	03	-04	05	-01	70

Note: Decimal points omitted.

FACTOR INTERPRETATION

Factor A: Figural Cognition

No.	Variable	Factor Loadings		
		I (1)	II (1)	III (1)
90	Surface Development	.69	.75	.70
67	Closure Flexibility	.59	.51	.62
80	Choosing a Path	.65	.53	.58
77	Card Rotation	.44(X_3.30)	.52(D.30)	.54(X_3.32)
91	Paper Folding	.51(X_1.32,G.35)	.66	.49(X_1.35,W.31)
78	Cube Comparison	.47	.66	.47
85	Figure Analogies	.48(C.31,E.31)	.48(C.31,E.34)	.47(X_1.35,E.30)
70	Hidden Patterns	.35(E.63)	.30(E.65)	.47(E.55)
72	Concealed Words	.28(C.31,X_4-.41)	.22(C.42,X_4-.34)	.38(C.40)
20	Evolving Figures	.38(X_1.31)	.37(Y.33,K.53)	.35(X_1.31,K.40)
65	Figure Classification	.50(F.30)	.44	.34(F.38,X_2-.40)
25	Motion-Time Translation	.31(B.37,W.31)	.37(B.42)	.32(B.38)
62	Picture Group Naming	.31(X_1.39)	.41	.32(X_1.46)
79	Maze Tracing Speed	.22(D.68)	.26(D.70)	.32(D.66)
63	Closure Speed	.28(S-.36,I.48)	.27(I.48)	.31(I.55)
73	Estimation of Length	.34(X_1.31,K-.30, T.35,X_6.38)	.09(X_{10}.84)	.29(X_1-.30,X_6 .30)
68	Picture Classification	.40(X_1.41,X_4.38, I.30)	.50(I.35)	.29(X_1.34,I.67)
37	Pattern Association	.21	.31(K-.59)	.25(K-.47,X_8 -.30)
66	Figure Matrix	.31(X_1.58)	.49(X_{11}.33)	.20(X_1.59)
29	Social Abstracts IIB	.21(X_1.75)	.44	.19(X_1.70)
28	Social Abstracts IIA	.11(X_1.70)	.33(M.30)	.08(X_1.70)

Factor A is considered a second- or higher-order factor appearing in the first-order domain. Its most general identification is Figural Cognition. Although all of Guilford's product levels are represented, the factor seems most heavily dependent upon implications, transformations, and systems products. Its characteristics conform to the operation hierarchy hypothesis, even though separate product factors were not found. The factor has also included some convergent-thinking reference tests and these also seem to conform to the hierarchy notion. Intercorrelations among cognition product tests may be seen to form a rough simplex in Table 3. If the loadings for those tests representing each cognition product level are squared and averaged, the increasing function depicted in Figure 2 is obtained. Two of the three implications level tests seem not to perform as predicted, but it should be emphasized that these tests were chosen from the ETS reference factor called "spatial scanning" (French, Ekstrom, and Price, 1963), not from the appropriate Guilford reference factor. Only test 80 represents both reference factors. The loadings of tests 79 and 81 on another factor suggest an alternative interpretation for the factor of spatial scanning, to be discussed later. The hierarchical hypothesis is thus not untenable.

Factor X_1: Serial Relations

		Factor Loadings		
No.	Variable	I (7)	II	III (5)
28	Social Abstracts IIA	.70	—	.70
29	Social Abstracts IIB	.75	—	.70
66	Figure Matrix	.58(A.30)	—	.59
30	Story Frames	.47(B.47)	—	.49(B.38)
62	Picture Group Naming	.39(A.30)	—	.46(A.32)
26	Social Abstracts IA	.44(j.31)	—	.41(U-.33,J.34, X_3.33)
91	Paper Folding	.35(G.35,A.51)	—	.35(A.49,W.31)
85	Figure Analogies	.29(C.31,A.48, E.31)	—	.35(A.47,E.30)
68	Picture Classification	.41(A.40,X_4.38,I.30)	—	.34(I.67)
20	Evolving Figures	.31(A.38)	—	.31(A.35,K.40)
73	Estimation of Length	.31(A.34,X_7-.30, T.35,X_6.38)	—	.30(X_6.30)

Factor X_1 is a strong separate factor in the analyses for problems I and III and includes loadings for several of the tests which define Factor A. In problem II, Factor A has incorporated the variables defining X_1. It is likely that the two factors are closely related, possibly in a superordinate-subordinate relationship. This factor includes three of the four film tests hypothesized to measure cognition of, or short term memory for, serial figural relations. Also included are variables 66 and 85, the reference tests for Guilford's cognition of figural relations ability. Variable 30 had been

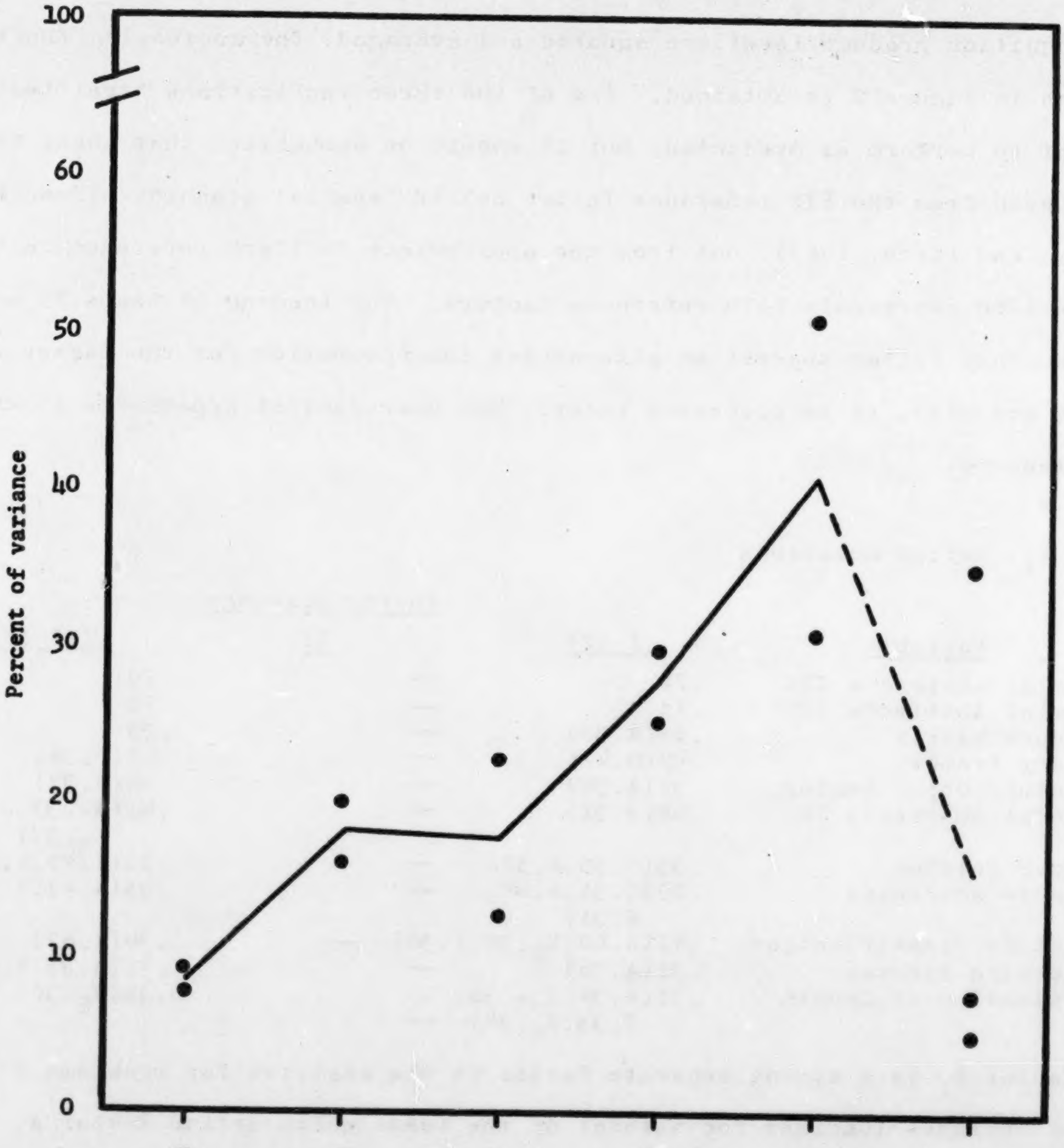


Figure 2. Percent of variance accounted for by Factor A in tests at six levels of Guilford's Products dimension.

expected in another hypothesized relations factor, called Behavioral Memory. Its shift to this factor seems to suggest that serial cognition, or a relatively short term memory process, is involved rather than memory ability as traditionally conceived.

Factor B: Serial Integration

		Factor Loadings		
No.	Variable	I (2)	II (2)	III (7)
17	Successive Perception III	.83	.84	.79
16	Picture Identification	.83	.79	.77
18	Successive Perception IV	.77	.76	.75
43	Short Term Memory IB, IIB, IIIB	-.01(Y.74)	.61(Y.31)	.63(Y.48)
95	Viewing Distance	-.47(X_7-.39)	-.57(X_8.33)	-.58
94	Far Point Visual Acuity	.63(X_3.31)	.57(V.43)	.57
8	Minimal Movement	.48(G.30,X_7.44)	.55	.54(K.38)
12	Sequential Words	.51(C.39)	.53(C.37)	.49(C.36)
41	Attention Span III	.46(J.47)	.48(J.39)	.42(J.36)
25	Motion Time Translation	.37(A.31,W.31)	.42(A.37)	.38(A.32)
30	Story Frames	.47(X_1.47)	.47(Y.30)	.38(X_1.49)
24	Speed Estimation	.35(U.33)	.36	.33(U.37)
93	Color Sensitivity	.30(C.30,S-.34)	.31(A.31,S-.44, P.32)	.32(S-.39,P.38)
47	Short Term Visual Memory IF, IIF, IIIF	.20(Y.51)	.39(Y.45,B.34)	.18(Y.65)

Factor B includes all of the film tests hypothesized as measures of serial integration. All involve rapid reception of temporally spaced stimuli, their organization into meaningful whole cognitions, and possibly their verbal labelling. Temporal closure seems to be the critical task characteristic. The factor is not simply figural cognition or spatial closure, since the relevant reference tests did not appear. Sensitivity to visual detail, as represented by the acuity and viewing distance variables, must play a substantial role in the integration process. While variables 8, 24, 25, and 30 were not initially expected here, all require serial comparison in complex dynamic stimulus presentations. Such an iterative cognition process could underlie speed estimation, sensitivity to visual movement, and other tasks involving short-term memory representation of non-static stimuli.

Factor C: Verbal Facility

		Factor Loadings		
No.	Variable	I (3)	II (3)	III (3)
64	Word Transformation	.75	.74	.75
83	Camouflaged Words	.77	.77	.74
87	Word Combination	.65	.67	.67
84	Disemvoweled Words	.64(E.35)	.64(E.31)	.66
82	Wide Range Vocabulary	.56(I.31)	.53(R-.33,I.32)	.57
33	Film Memory II	.51(T-.31)	.51(X_4.32)	.51
39	Attention Span I	.44(Y.57)	.41(Y.63)	.43(Y.59)
72	Concealed Words	.39(X_4-.41)	.42(X_4-.34)	.40(A.38)
40	Attention Span II	.37(Y.55)	.35(Y.55)	.38(Y.41)
12	Sequential Words	.39(B.51)	.37(B.53)	.36(B.49)
85	Figure Analogies	.31(A.48,E.31)	.31(A.48,E.34)	.28(X_1.35,A.47, E.30)

Factor C is clearly a combination of verbal comprehension and other symbolic cognition and convergent thinking factors, and may be given the general identification "verbal facility." The presence of Film Memory II in this factor is best discussed in connection with the next factor.

Factor D: Serial Orientation

		Factor Loadings		
No.	Variable	I (22)	II (12)	III (6)
79	Maze Tracing Speed	.68	.69	.66(A.32)
58	Position Recall II	.54(N.41)	.45(N.41)	.59(N.41)
5	Flying Orientation	.37(F.35)	.38(F.39)	.51(F.35)
81	Map Planning	.55	.49(E.34)	.46(E.34,X_{11}-.31)
71	Copying	.49(W.47)	.38(W.54)	.46(W.46)
32	Film Memory I	.40(S-.45)	.53(S-.34)	.43(U.37)
69	Identical Pictures	.41(X_1.34,E.34)	.34(E.39)	.33(V.37,E.38)
27	Social Abstracts IB	.19(X_7.60)	.32(K.56,M.47)	.22(K.67)
77	Card Rotation	.29(A.44,X_3.30)	.30(A.52)	.21(A.54,X_3.32)
10	Rotation I	.30(H.34)	.18(X_8.58,W.32)	.20(X_8.69)

This factor contains only one of the three film tests constructed to represent serial orientation, yet this identification remains the most appropriate. Maze tracing and map planning represent a reference factor previously called "spatial scanning" (French, Ekstrom, and Price, 1963) which should, it was hypothesized, involve rapid serial processing of spatial images. Presumably Ss negotiate the mazes or maps using an iterative scanning-following procedure to direct or orient their tracing. The presence here of variables 58 and 69 suggests that memory for temporal order and perceptual speed are involved in this iterative process or conversely that serial orientation, as here discussed, is part of temporal ordering and perceptual speed abilities.

The division of Film Memory I and II between factors D and C, respectively, deserves special note. Although the two tests differ in content, their separation seems independent of this difference. Instead, the preferred explanation rests on the fact that Film Memory I immediately preceded Film Memory II in administration order. For the first test, vague instructions gave Ss little opportunity to anticipate the nature of the memory task. Film content had to be stored unselectively until response instructions were clarified. It is contended that such a storage process must use imagery or iconic representation, rather than labels or symbolic representation. Verbalization occurs at recall time, not at storage time. The succeeding test, Film Memory II, permits prediction (i.e., selection) of significant details at storage time and intentional, rather than "incidental" memory.

Factor E: Perceptual Speed

		Factor Loadings		
No.	Variable	I (17)	II (5)	III (12)
76	Number Comparison	.72	.72	.70
75	Addition	.63	.64	.70
70	Hidden Patterns	.63(A.35)	.65(A.30)	.55(A.47)
69	Identical Pictures	.34(D.41,X_1.34)	.39(D.32)	.38(V.37,D.33)
81	Map Planning	.29(D.55)	.34(D.49)	.34(D.46,X_{11} -.31)
85	Figure Analogies	.31(C.31,A.48)	.34(C.31,A.48)	.30(X_1.35,A.47)
84	Disemvoweled Words	.35(C.64)	.31(C.64)	.28(C.66)
47	Short Term Visual Memory IF, IIF, IIIF	-.03(Y.51)	.34(B.39,Y.45, E.34)	.15(Y.65)
4	Successive Perception IIC	.39(H.33)	.34(H.54)	.12(X_2.75)

Factor E represents perceptual speed. Variables 70 and 75, while usually considered as references for other factors, are simple, highly speeded tests. With these Ss, variance in arithmetic facility, for example, probably arises largely from differences in performance rate.

Factor F: Serial Accumulation

		Factor Loadings		
No.	Variable	I (9)	II (9)	III (10)
1	Successive Perception I	.76	.73	.75
2	Successive Perception IIA	.71	.74	.69
3	Successive Perception IIB	.56	.50	.59
65	Figure Classification	.30(A.50)	.29(A.44)	.38(A.34,X_2-.40)
5	Flying Orientation	.35(D.37)	.39(D.38)	.35(D.51)
60	Position in Succession	.24(X_3.67)	.30(G.50,S-.30, X_8.31)	.27(X_2.75)
4	Successive Perception IIC	.33(E.39,H.33)	.26(E.34,H.54)	.27(X_2.75)

The identification "serial accumulation" is applied here to a factor comparable to Roff's (1952) "sequential perception." It is proposed that the figural image cognitions required in these tests are "accumulated" over a slow-paced temporal series, rather than "integrated" in rapid series, as in factor B. The loadings for variables 5 and 60 support this interpretation. It is also possible that the distinction between B and F rests in part on a verbal labelling component in the former. The presence of Figure Classification, but not Picture Classification, further emphasizes the nonverbal character of this factor.

Factor X_2

		Factor Loadings		
No.	Variable	I	II	III (16)
4	Successive Perception IIC	—	—	.75
65	Figure Classification	—	—	-.40(A.34,F.38)

X_2 appeared only in Problem III. It is apparently a "splinter" subordinate to Factor F and of little psychological significance.

Factor G: Static Visual Memory

No.	Variable	Factor Loadings I (6)	 II (4)	 III (4)
88	Position Memory	.83	.75	.83
56	Number-Word Association	.69	.77	.68
74	Picture-Number	.69(X_6-.31)	.68	.64(X_6-.31)
57	Position Recall I	.54	.61	.56
59	Space Memory	.40(X_4.57)	.37(X_4.66)	.56(U-.31,X_6.37)
89	Pattern Detail Memory	.35(J.31,X_4.40, I.33)	.34(J.30,X_4.34, I.38)	.39(J.36,I.34)
80	Choosing a Path	.24(A.65)	.17(A.53)	.31(A.58)
86	Color Memory	.33(X_3.63)	.49	.27(X_3.73)
61	Color Recall	.30(X_3.37,O-.44)	.45(X_8.34,O-.41)	.23(X_3.54)
8	Minimal Movement	.30(B.48,X_7.44)	.27(B.55)	.23(B.54,K.38)
60	Position in Succession	.24(X_3.67)	.50(F.30,S-.30, X_8.31)	.21(X_3.60)

Factor G is a second-order combination of Christal's (1958) associative memory, memory for spatial position, and color memory factors. It might best be given the name "static visual memory."

Factor X_3: Color Memory

No.	Variable	Factor Loadings I (23)	 II	 III (30)
86	Color Memory	.63(G.33)	—	.73
60	Position in Succession	.67	—	.60
61	Color Recall	.37(G.30,O-.44)	—	.54
26	Social Abstracts IA	.24(X_1.44,J.31)	—	.33(X_1.41,U-.33, J.34)
77	Card Rotation	.30(A.44)	—	.32(A.54)
94	Far Point Visual Acuity	.31(B.63)	—	.18(B.57)

This factor is subordinate to the general memory factor just described, but exists only in solutions for Problems I and III. For Problem I especially, an experimental dependency relation between variables 86 and 60 may have influenced the separation of this factor.

Factor X_4: Memory for Form (?)

No.	Variable	Factor Loadings I (28)	 II (28)	 III
59	Space Memory	.57(G.40)	.66(G.37,X_9.28)	—
89	Pattern Detail Memory	.40(G.35,J.31, I.33)	.34(G.34,J.30, I.38)	—

72	Concealed Words	-.41(C.39)	-.34(C.42)	—
35	Abstract Reasoning	.13(X_6.65)	.33(N.30,J.37)	—
33	Film Memory II	.19(C.51,T-.31)	.32(C.51)	—
68	Picture Classification	.38(X_1.41,A.40, I.30)	.24(A.50,I.35)	—

Factor X_4 is also a subordinate to Factor G, occurring in Problems I and II. In further work, it might be shown to have some psychological significance, perhaps as a form memory ability; variable 89 was designed by Christal specifically as a measure of memory for form and variable 59 is the only memory for spatial position test which is clearly geometric in nature.

Factor H: Memory for Figural Detail (?)

		Factor Loadings		
No.	Variable	I (26)	II (13)	III (27)
21	Figure Detail Memory	.74	.72	.68
4	Successive Perception IIC	.33(F.33,E.39)	.54(E.34)	.15
42	Short Term Visual Memory IA, IIA, IIIA	.22(Y.39,X_6.34)	.36(Y.37,M.31)	.01(Y.67)
10	Rotation I	.34(D.30)	.15(X_8.58,W.32)	.11 (X_8.69)

Factor H, although extracted in all three analyses, does not seem sufficiently well defined for clear identification. Figure Detail Memory is a film test designed as a measure of form memory. Variables 4, 10, and 42 seem also to require recognition of figural details, but other tests involving such recognition were found not to be loaded here.

Factor I: Figural Detail Comparison

		Factor Loadings		
No.	Variable	I (12)	II (15)	III (24)
68	Picture Classification	.30(X_1.41,A.40, X_4.38)	.35(A.50)	.67(X_1.34)
63	Closure Speed	.48(S-.36)	.48	.55(A.31)
89	Pattern Detail Memory	.33(G.35,J.31, X_4.40)	.38(G.34,J.30, X_4.34)	.54(G.39,J.36)
11	Rotation II	.73	.77	.53(V.31)
82	Wide Range Vocabulary	.31(C.56)	.32(C.53,R-.33)	.15(C.57)

The suggested common characteristic of the first four tests listed above is a figural comparison process. For example, closure speed seems to involve allocating figural boundaries either to the silhouetted objects or to the erasures. Through repeated comparisons, each boundary is assigned by S to one or the other. Rotation II also requires comparison and distinguishing the details of two oppositely rotating figures, so that the two may be recognized among four alternatives. The details of picture stimuli in Picture Classification and of figures in Pattern Detail Memory are similarly significant. There may be reason to believe that verbalization is an aid in this process.

Factor J: Serial Detail Comparison

			Factor Loadings	
No.	Variable	I (16)	II (24)	III (14)
7	Landing Judgment	.82	.82	.79
22	Random Shape Memory	.43(X_6-.37)	.21	.49
41	Attention Span III	.47(B.46)	.39(B.48)	.36(B.42)
89	Pattern Detail Memory	.31(G.35,X_4.40, I.33)	.30(G.34,X_4.34, I.38)	.36(G.39,I.54)
26	Social Abstracts IA	.31(X_1.44)	.28(M.35)	.34(X_1.41,U-.33, X_3.33)
35	Abstract Reasoning	.18(X_6.65)	.37(N.30,X_4.33)	.15(X_6.69)
48	Short Term Visual Memory IG, IIG, IIIG	.06(Y.44)	.30(Y.56)	-.13(Y.81)

Factor J is similar in some respects to Factor I. Aside from the involvement of Pattern Detail Memory in both, the two sets of tests seem to share a prominence of detail comparison processes. In Factor J, the temporal-sequential character of decision-making appears to be particularly distinctive. There is some possibility that Factor J represents comparison resulting in synthesis, while Factor I represents comparative analysis, but distinctive variables to clarify this are not apparent.

Factor X_5:

			Factor Loadings	
No.	Variable	I	II (16)	III
22	Random Shape Memory	-	.69	-
24	Speed Estimation	-	.49	-
74	Picture-Number	-	.30	-

This factor is a splinter associated with Factor J in analysis II; no psychological significance is suggested.

Factor X_6:

No.	Variable	Factor Loadings		
		I (20)	II	III (15)
35	Abstract Reasoning	.65	—	.69
59	Space Memory	.22(G.40,X_4.57)	—	.37(G.56,U-.31)
38	Color Form Recognition	.16(W.59)	—	.31(W.53)
74	Picture-Number	-.31(G.69)	—	-.31(G.64)
73	Estimation of Length	.38(X_1.31,A.34, X_7-.30,T.35)	—	.30(X_1-.30)
22	Random Shape Memory	-.37(J.43)	—	-.23(J.49)
42	Short Term Visual Memory IA, IIA, IIIA	.34(Y.39)	—	.08(Y.67)

Factor X_6 is a conglomerate consisting predominantly of tests involving figural memory in various contexts. It is inadequately specified by these variables.

Factor K: Reflective Serial Relations

No.	Variable	Factor Loadings		
		I (15)	II (20)	III (21)
27	Social Abstracts IB	.25(X_7.60)	.56(D.32,M.47)	.67
37	Pattern Association	-.75	-.59(A.31)	-.47(X_8-.30)
20	Evolving Figures	.48(X_1.31,A.38)	.53(Y.33,A.37)	.40(X_1.31,A.35)
8	Minimal Movement	.06(B.48,G.30, X_7.44)	.24(B.55)	.38(B.54)

This factor bears some relation to Factor X_1. Where Factor X_1 seemed based on active cognition of serial relations during stimulus presentation, Social Abstracts IB and, to some extent, Evolving Figures may depend upon a more reflective recognition of figural relations in remembered stimulus content. Social Abstracts IB was presented without specific instructions. Presumably, in answering the printed questions which followed the film, Ss drew serial relations in hindsight. Apparently, the kind of active, specified, and static associative processes called for by variable 37 stands in opposition to this passive, reflective process.

Factor X_7:

No.	Variable	Factor Loadings I (24)	II	III
27	Social Abstracts IB	.60	—	—
8	Minimal Movement	.44(B.48,G.30)	—	—
95	Viewing Distance	-.39(B-.46)	—	—
73	Estimation of Length	-.30(X_1.31,A.34, T.35,X_6.38)	—	—

Factor X_7 was extracted only in Problem I. It is apparently an alternate to Factor K.

Factor X_8:

No.	Variable	Factor Loadings I	II (26)	III (28)
10	Rotation I	—	.58(W.32)	.69
37	Pattern Association	—	-..9(A.31,K-.59)	-.30(K.-.47)
95	Viewing Distance	—	.33(B-.57)	.17(B-.58)
60	Position in Succession	—	.31(F.30,G.50, S-.30)	.17(X_3.60)
61	Color Recall	—	.34(G.45,O-.41)	.10(X_3.54)

While Rotation I may deserve further consideration as a kind of figural detail memory task (see Factor H), there is insufficient information available in Factor X_8 to clarify its functioning.

Factor L: Serial Memory Span

No.	Variable	Factor Loadings I (5)	II (7)	III (8)
54	Auditory Letter Span	.85	.84	.85
53	Auditory Number Span	.83	.83	.83
55	Visual Digit Span	.30(X_9.74)	.28(X_9.80)	.46(U-.37)

Factor L is the traditional memory span factor which, in this context, has been called Serial Memory Span. It is noteworthy, however, that the visual task, variable 55, is less heavily loaded here than are the auditory memory tasks.

Factor X_9:

		Factor Loadings		
No.	Variable	I (29)	II (10)	III
55	Visual Digit Span	.74(L.30)	.80	—
48	Short Term Visual Memory IG, IIG, IIIG	-.47(Y.44)	-.21(Y.56,J.31)	—

The separation of Factor X_9 from Factor L in two analyses suggests that a distinction between auditory and visual memory span may be appropriate. With sufficient representation of both sense modalities in future studies, these parallel factors might be more effectively defined than was possible here.

Factor M: Long-Term Memory for Temporal Order (?)

		Factor Loadings		
No.	Variable	I (10)	II (23)	III (26)
36	Sequence Memory	.74	.78	.78
28	Social Abstracts IIA	.25(X_1.70)	.47(A.33)	.27(X_1.70)
26	Social Abstracts IA	.25(X_1.44,J.31)	.35	.18(X_1.41,U-.33,J.34,X_3.33)

Sequence memory is one of Christal's memory for temporal order tests which in this study is seen to be supported by the "A" portions of Social Abstracts I and II, also involving temporal order memory. Since Christal's other temporal order tests do not appear here, Factor M stands only as a hypothesis requiring further confirmation, possibly as a relatively long-term memory for temporal order.

Factor N: Short-Term Memory for Temporal Order (?)

		Factor Loadings		
No.	Variable	I (21)	II (18)	III (19)
6	Estimation of Velocity	.78	.80	.81
58	Position Recall II	.41(D.54)	.41(D.45)	.41(D.59)
35	Abstract Reasoning	.21(X_6.65)	.30(J.37,X_4.33)	.21(X_6.69)

Variable 6 requires prediction of the position of a moving object at a given point in time. These predictions involve extrapolation of a temporal order and hence may be dependent on a kind of short-term memory for, or serial cognition of, temporal order. Since variable 58 is one of Christal's temporal order memory tests, the distinction between Factors M and N may be based on short- versus longer-term memory processes.

Factor O:

			Factor Loadings	
No.	Variable	I (30)	II (21)	III (23)
31	Story Sequences	.81	.80	.85
61	Color Recall	-.44(G.30,X_3.37)	-.41(G.45,X_8.34)	-.28(X_3.54)

Factor P:

			Factor Loadings	
No.	Variable	I (18)	II (19)	III (11)
34	Film Memory III	.82	.79	.79
93	Color Sensitivity	-.27(C.30,S-.34)	-.32(A.31,S.44)	-.38(B.32,S-.39)

Factors O and P are insufficiently defined for interpretation. Both variables 31 and 34 were hypothesized as measures of behavioral memory, for which no single factor appeared. These factors may suggest that "behavioral memory" is multi-faceted and may stand as hypotheses for separate factors in further research in Guilford's behavioral content domain.

Factor Q:

			Factor Loadings	
No.	Variable	I (25)	II (25)	III (29)
9	Drift Direction	.86	.83	.83

Factor Q, a singleton, is represented by one of the tests from Roff's Sensitivity to Visual Movement factor. Its separation implies that his sensitivity factor may be subdivided.

Factor R:

			Factor Loadings	
No.	Variable	I (19)	II (27)	III (20)
23	Speed Changes	.86	.87	.86
82	Wide Range Vocabulary	-.23(C.56,I.31)	-.33(C.53,I.32)	-.24(C.57)

Speed Changes is one of three tests designed to tap speed perception. The idea that a single ability might represent such a complex function is probably naive.

Factor S:

No.	Variable	I (13)	II (17)	III (13)
		Factor Loadings		
14	Shapes	.73	.74	.79
93	Color Sensitivity	-.34(C.30)	-.44(A.31)	-.39(B.32)
63	Closure Speed	-.36(I.48)	-.28(I.48)	-.26(A.31,I.55)
32	Film Memory I	-.45(D.40)	-.34(D.53)	-.25(D.43,U.37)
60	Position in Succession	-.08(X_3.67)	-.30(F.30,G.50, X_8.31)	-.17(X_3.60)

Factor T:

No.	Variable	I (14)	II (14)	III (18)
		Factor Loadings		
15	Shape Changes	.82	.86	.85
73	Estimation of Length	.35(X_1.31,A.34, X_7-.30,X_6.38)	.13X_{10}.84	.28(X_1-.30,X_6.30)
33	Film Memory II	-.31(C.51)	-.21(C.51,X_4.32)	-.25(C.51)
19	Hidden Figures	.30	.21(X_{11}.62)	.17(X_{11}.75)

Both Factors S and T are faintly supported singletons. While they may suggest factors worth further study, they cannot be adequately identified at present. It should be noted that variables 14 and 15 employ identical sets of rectangular shapes as response alternatives and the same "key" stimulus rectangle. They differ in that variable 14 provides an isolated, tachistoscopic exposure of the stimulus while, in variable 15, it appears for the same time interval but is embedded in the context of a rectangle constantly changing in shape. The separation and negative loadings of Film Memory I and Film Memory II between Factors S and T also deserve further consideration.

Factor U: Visual Distortion Effects (?)

No.	Variable	I (11)	II (11)	III (17)
		Factor Loadings		
96	Viewing Angle	.79	.79	.77

Factor U (continued)

			Factor Loadings	
No.	Variable	I (11)	II (11)	III (17)
55	Visual Number Span	.10(L.30,X_9.74)	.10(X_9.80)	.37(L.46)
24	Speed Estimation	-.33(B.35)	-.27(B.36)	-.37(B.33)
32	Film Memory I	-.29(D.40,S-.45)	-.26(D.53,S-.34)	-.37(D.43)
26	Social Abstracts IA	.24(X_1.44,J.31)	.28(M.35)	.33(X_1.41,J.34, X_3.33)
58	Position Recall II	.25(D.54,N.41)	.19(D.45,N.41)	.31(D.59,N.41)

Factor V: Visual Sensitivity (?)

			Factor Loadings	
No.	Variable	I (27)	II (30)	III (9)
92	Near Point Visual Acuity	.75	.75	.79
69	Identical Pictures	.34(D.41,X_1.34, E.34)	.22(D.34,E.39)	.37(D.33,E.38)
11	Rotation II	.17(I.73)	.15(I.77)	.31(I.53)
94	Far Point Visual Acuity	.24(B.63,X_3.31)	.43(B.57)	.21(B.57)

Factors U and V represent marker variables for viewing conditions and visual acuity. Apparently, performance on some tests is affected by these variables.

Factor X_{10}:

			Factor Loadings	
No.	Variable	I	II (22)	III
73	Estimation of Length	—	.83	—

This is a splinter which has no significance. Estimation of Length is apparently a singleton factor for Problem II only.

Factor X_{11}:

			Factor Loadings	
No.	Variable	I	II (29)	III (25)
19	Hidden Figures	—	.62(A.26)	.75
81	Map Planning	—	-.22(D.49,E.34)	-.31(D.46,E.34)
13	Successive Comparison	—	.32(W.36)	.21(W.30)
66	Figure Matrix	—	.33(A.49)	.20(X_1.59)

In Problems II and III, variable 19 was isolated as another faintly supported singleton.

Factor W: Figural Reproduction

No.	Variable	Factor Loadings		
		I (8)	II (6)	III (22)
52	Plane Formation III	.67	.69	.72
51	Plane Formation II	.71	.68	.72
50	Plane Formation I	.63	.64	.60
38	Color Form Recognition	.59	.55	.53(X_6.31)
71	Copying	.48(D.49)	.54(D.38)	.46(D.46)
91	Paper Folding	.32(X_1.32,G.35, A.51)	.28(A.66)	.31(X_1.35,A.49)
25	Motion-Time Translation	.31(B.37,A.31)	.28(B.42,A.37)	.27(B.38,A.32)
10	Rotation I	.36(D.30,H.34)	.32(X_8.58)	.26(X_8.69)
13	Successive Comparison	.36	.30(X_{11}.32)	.22

Factors W and Y were withheld for presentation here since both are dominated, more than are other factors, by specific part-test interrelations and because some special forms of data analysis are possible with them. Factor W is not simply a specific factor, since the Plane Formation part-tests are substantially supported by several other variables. The Plane Formation test was originally part of Roff's Sequential Perception factor. Earlier, Fruchter and Mahan's objection to Roff's identification was met by suggesting that performance on the test might be serial, but examinee-based. Isolating the part-tests in this study has aided its separation from Factor F, discussed earlier. Its correlates in Factor W suggest that a serial process comparable to that of Factor F is not centrally involved. Reproduction of simple figures or patterns seems to be the critical characteristic of the first five variables listed above. Parenthetically, it might be added that preliminary oblique rotations of the factors reported in this study have combined Factor W with Factor A in a bipolar, higher-order factor. This tentative finding encourages the suspicion that Factors W and A define a single figural cognition continuum, ranging from reproduction of units to increasingly extensive cognitive manipulation of input units.

Since variables 50, 51, and 56 differ systematically in the stimulus exposure intervals used in each, it was possible to plot change in factor structure across these variables in a manner similar to Fleishman (1962). These plots did not indicate reliable differences in structure for the three variables, although they are suggestive of differences worth further consideration. They are not included here.

Factor Y: Short Term Visual Memory-Specific

		Factor Loadings		
No.	Variable	I (4)	II (8)	III (2)
48	Short Term Visual Memory G	.44	.56(J.31)	.81
45	Short Term Visual Memory D	.65	.76	.79
49	Short Term Visual Memory H	.43	.56	.77
46	Short Term Visual Memory E	.62	.71	.74
42	Short Term Visual Memory A	.39(X_6.34)	.37(H.36,M.31)	.67
47	Short Term Visual Memory F	.51	.45(B.49,E.32)	.65
44	Short Term Visual Memory C	.61	.47	.64
39	Attention Span I	.57(C.44)	.63(C.41)	.59(C.43)
43	Short Term Visual Memory B	.74	.31(B.61)	.48(B.63)
40	Attention Span II	.55(C.37)	.55(C.35)	.41(C.38)
20	Evolving Figures	.29(X_1.31)	.33(Y.33,K.53)	.25(X_1.31,K.40)
30	Story Frames	.24(B.47,X_1.47)	.30(B.47)	.25(B.38,X_1.49)

Factor Y is a specific factor representing the content of the Short Term Visual Memory and Attention Span tests. Since variables 42 through 49 are similar to the stimulus conditions used by Averbach and Coriell (1961), an outline of their work is in order here. Short Term Visual Memory I represents an approximation to their first experiment; it provides a measure of the extent to which S can hold the array image until the bar marker designates a letter to be reported. STVM II approximates their second experiment in which the "erasing" effects of a circle marker were exhibited. STVM III, by presenting a bar marker simultaneously with the array and a delayed circle marker as an "eraser," approximated their third, "readout," experiment. Aside from the use of film, the principal distinction between the investigations lies in their use of 16 letter arrays, as opposed to the 8 letter arrays here.

In Figures 3, 4, and 5, graphs of mean performance at each marker delay interval are presented, for STVM I, II, and III, respectively; ranges and standard deviation values are also indicated. These graphs may be compared to those of Averbach and Coriell. For STVM I and II, the graphs are not particularly revealing. They show, as did the Averbach and Coriell data, performance facilitation at the shortest delay interval but at later delay stages, they are only crudely similar. Particularly, the effects of erasure in STVM II are not apparent in the present data. The difference in array size may underlie this masking of the erasure effort. By contrast, Figure 5 closely corresponds to their final graphs and may indicate that the circle marker did act as an eraser in this study.

From the condition in which the circle marker precedes the array and bar marker by 52 msecs. to the condition in which the circle follows the array and bar by 94 msecs., performance declines rapidly. Averbach and Coriell suggested that, in a range near 100 msecs. delay, the circle marker erases stimulus letters before they can be transferred from a short-term to a longer-term memory storage. Thereafter, the array and circle-marker are increasingly perceived as distinct stimuli and performance improves. Letters are transmitted to longer-term storage before the appearance of the circle marker and are then available for report.

Because of the number of Ss used here, it was possible also to analyze changes in factor structure over the delay range in a manner similar to Fleishman (1962). Figure 6 presents a plot of the variance accounted for at each delay interval by the specific factor, Y, together with other factors

SECTION 1

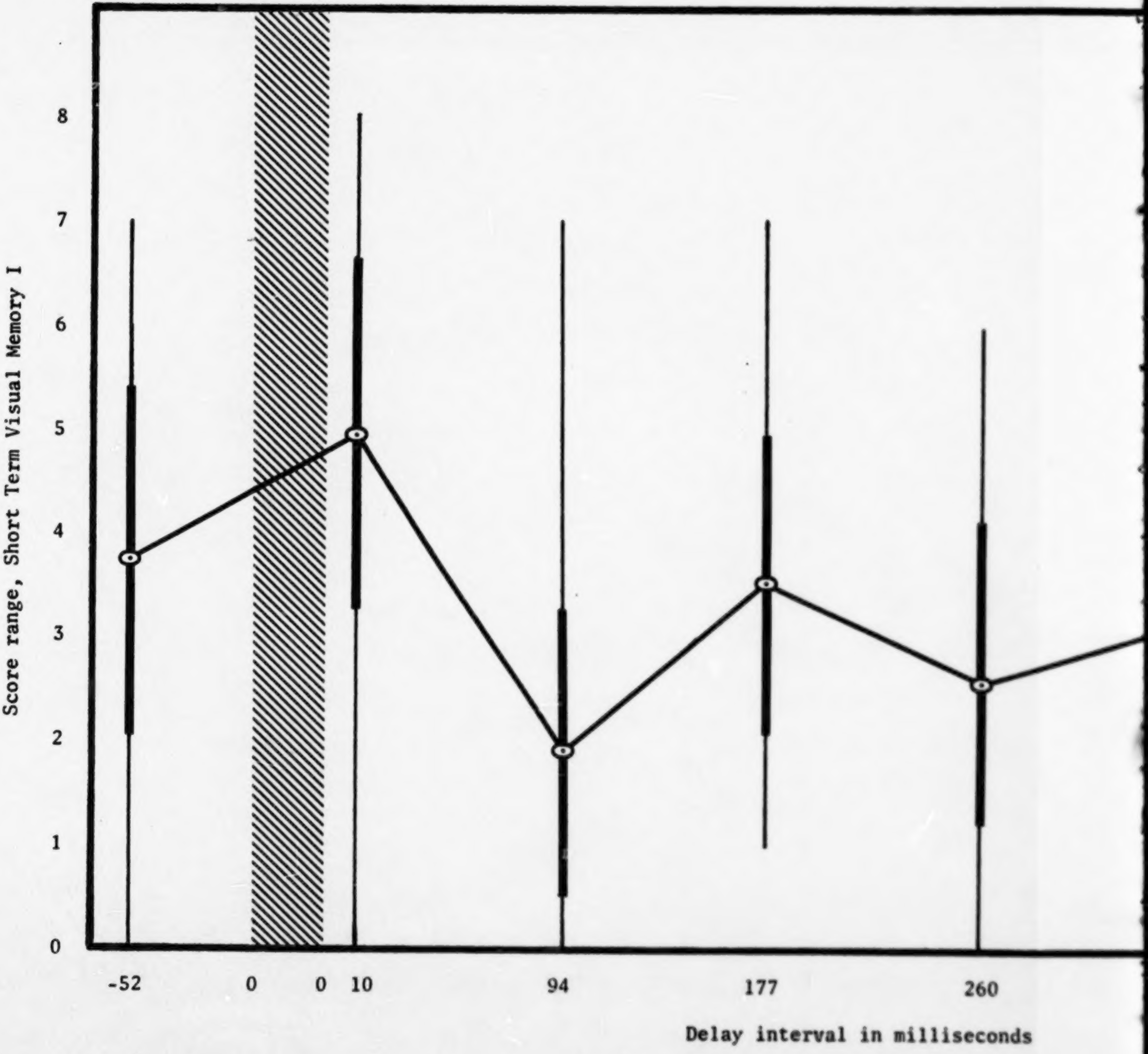
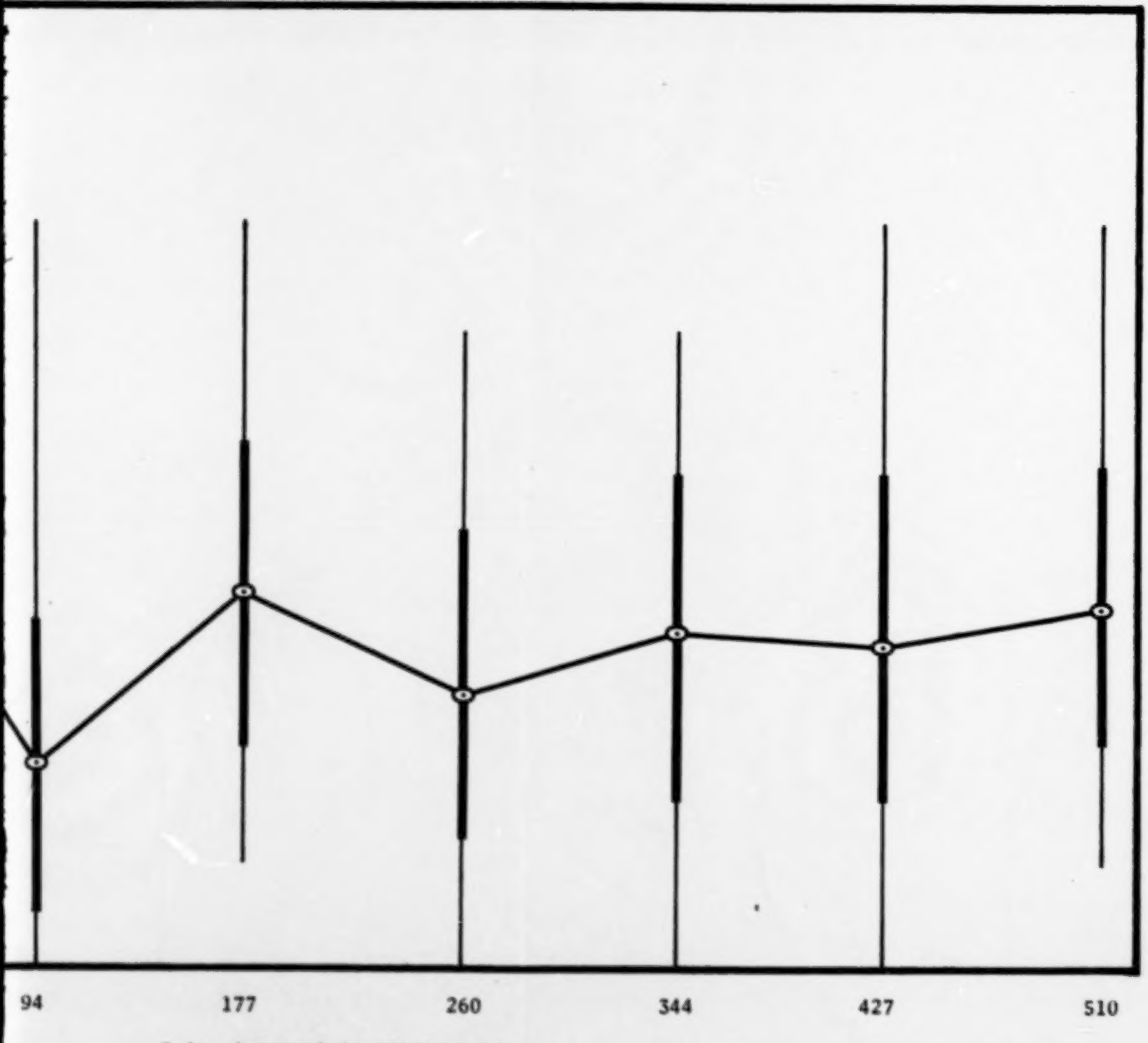


Figure 3. Means, standard deviations, and ranges of scores at the eight delay intervals

SECTION 2



, and ranges of scores at the eight delay intervals of Short Term Visual Memory I.

SECTION 1

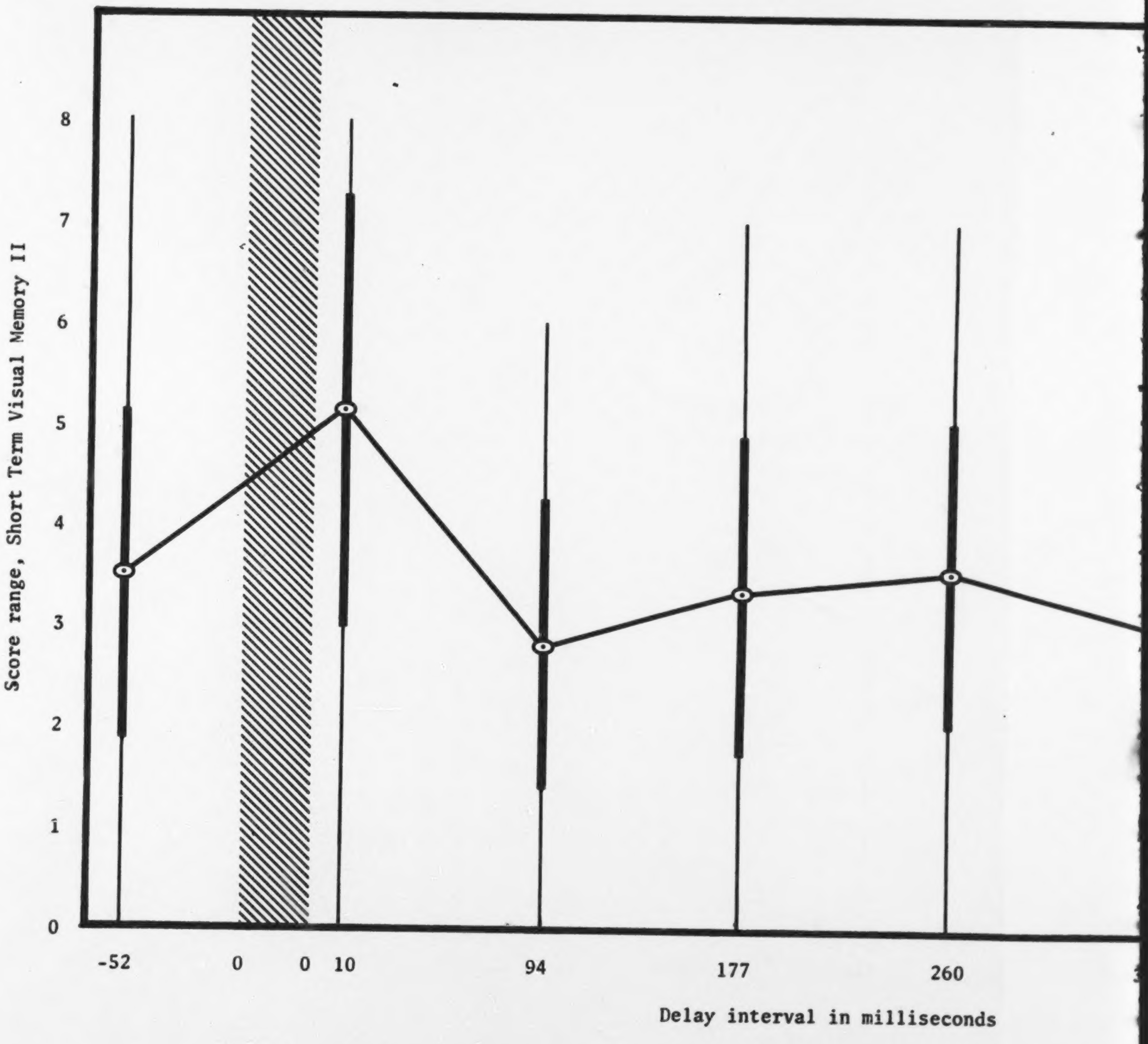
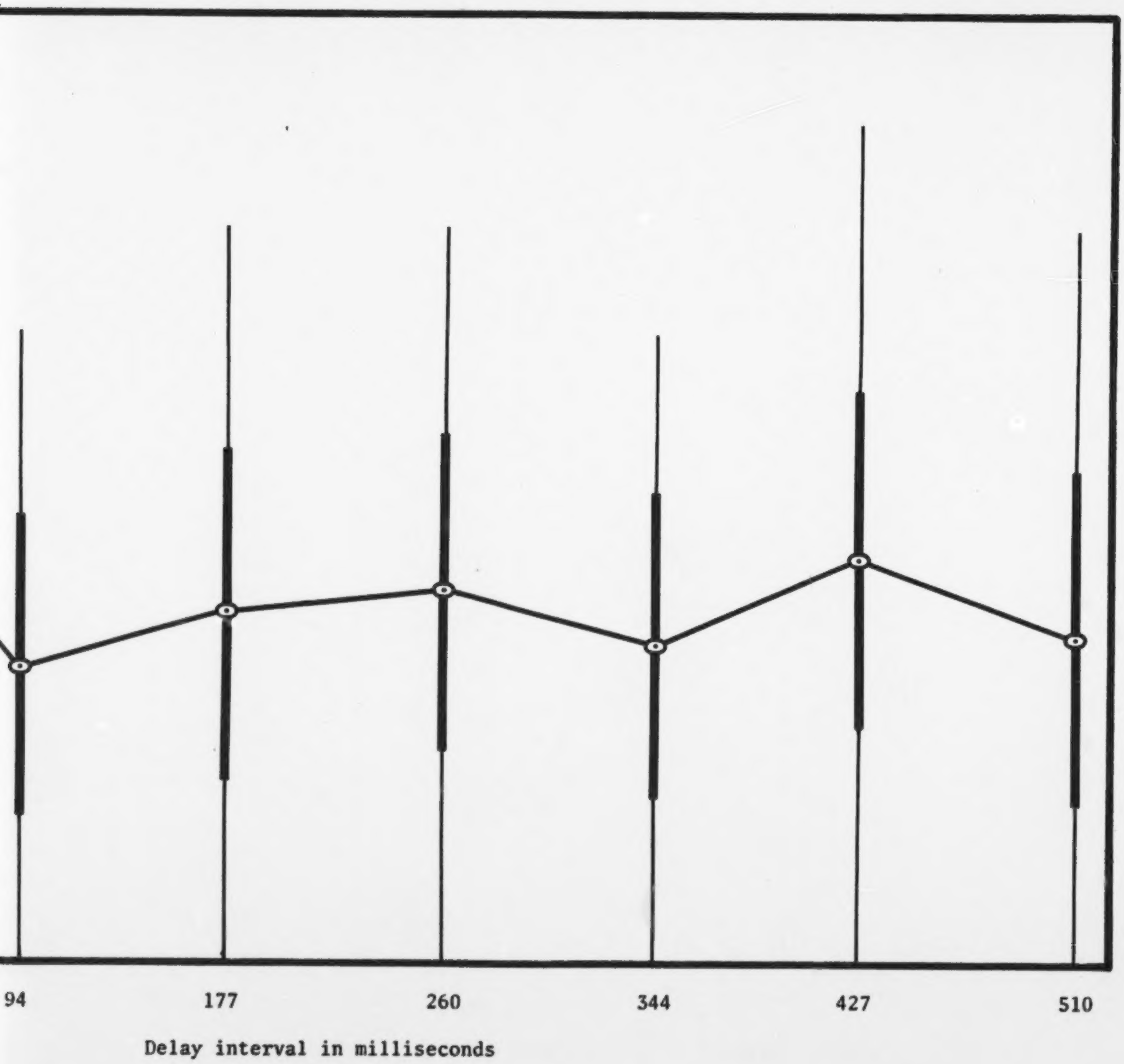


Figure 4. Means, standard deviations, and ranges of scores at the eight delay intervals of



and ranges of scores at the eight delay intervals of Short Term Visual Memory II.

SECTION 1

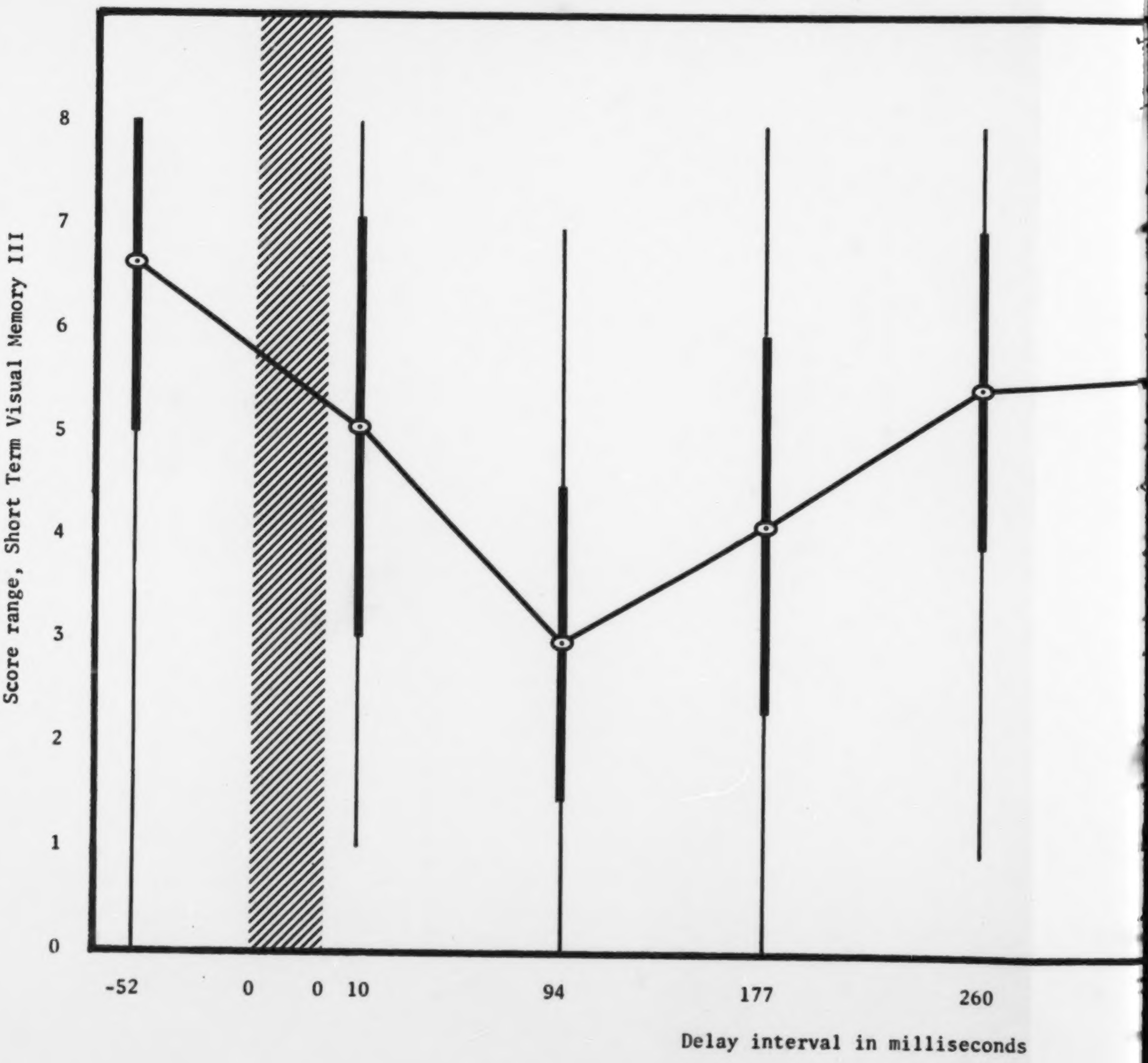
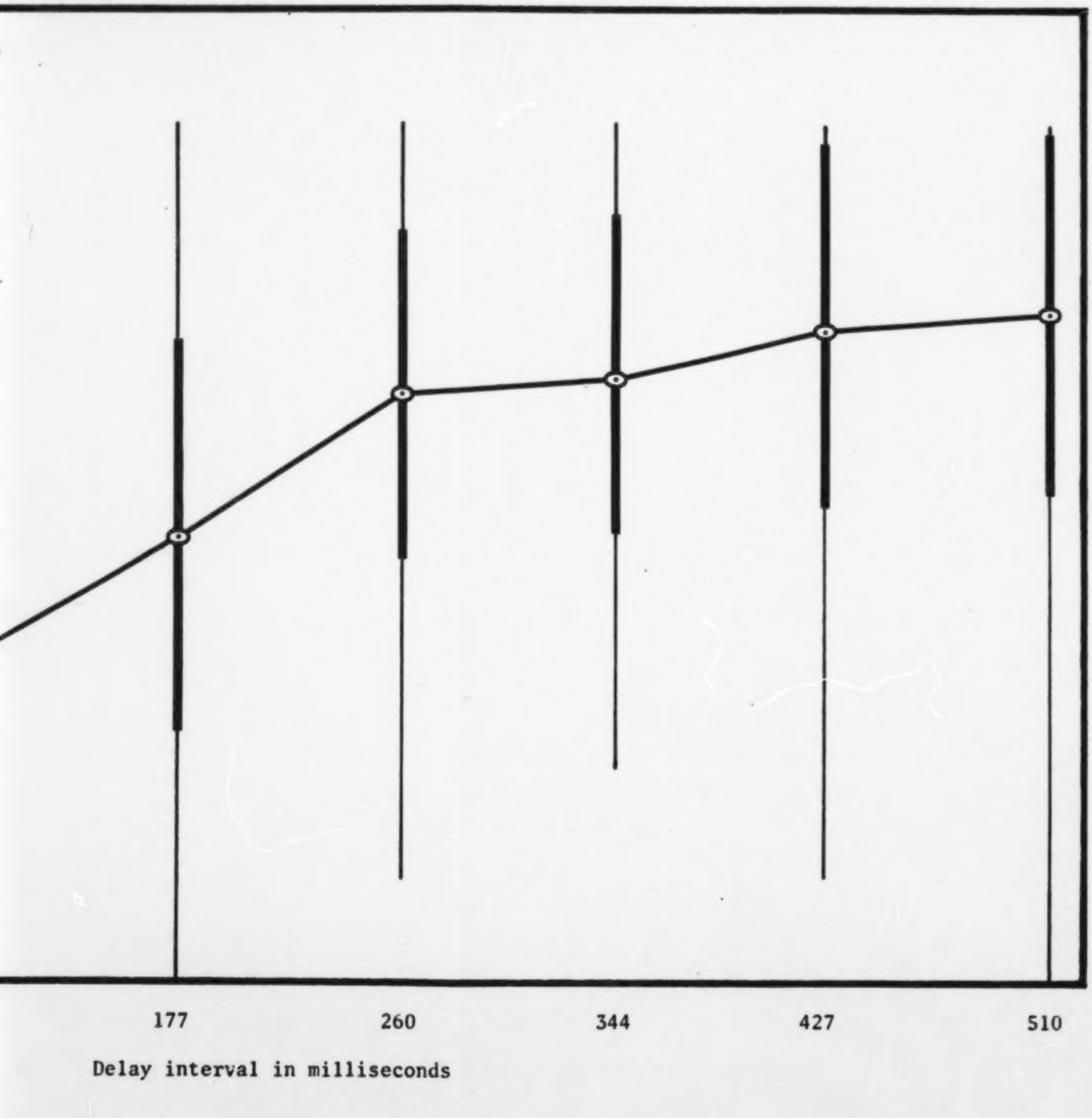


Figure 5. Means, standard deviations, and ranges of scores at the eight delay intervals o



ranges of scores at the eight delay intervals of Short Term Visual Memory III.

available in Problem I. It may be seen that the loadings for the specific factor decline regularly as delay interval increases. At a delay of 10 msecs., over 50% of performance variance is task specific, while at 510 msecs. delay, this has decreased to less than 20%. External variables seem to account for more variance at 344 and 510 msecs. The restriction at 428 msecs. is strange and hinders the comparison of short versus longer delays in terms of task simplicity-complexity from the standpoint of relations with external variables. Nonetheless, high task specificity may imply internal variance homogeneity or simplicity. As the bar marker is withheld for longer intervals, the task becomes more difficult and complex.

In Figure 7, the changes in factor structure for Short Term Visual Memory II are shown. Here, task specificity is at its maximum at a delay of 177 msecs., just after the range of maximum erasure effects. This intriguing form for the specific factor suggests several possibilities. One is that high specificity in the 177 and 260 msec. range represents an erasure recovery zone which may be physiologically based. Until a delay of 94 msecs. is reached, individual differences in performance are a function of other abilities (e.g., serial integration of array and marker). From 94 msecs. through 260 msecs., variance arises largely from individual differences in erasure recovery rate. With longer delays, recovery is no longer an important source of variance and external variables are again important. The role of the perceptual speed factor (E) at a delay time of 344 msecs. suggests that a position comparison of array letter and circle marker is involved and, just conceivably, that figural and symbolic comparisons in perceptual speed tests take about 344 msecs. Factor B and, to a lesser extent, Factor J seem involved both before and after the hypothetical "recovery" zone. Both are serial tasks involving integration or synthesis which might occur both as short-term and longer-term processes. It should be noted that only Factor U, Viewing Angle, is related to performance in the zone of greatest specificity and it is a stimulus, not a performance, variable.

Figure 8, representing the results for Short Term Visual Memory III, shows a crude trend toward increasing specificity at longer delay intervals. It appears that serial integration (B) is related to performance here in about the same way as with Short Term Visual Memory II, i.e., integration occurs principally before, and to some extent after, erasure. No other factor makes a substantial contribution. Increasing specificity may again indicate variance simplification. As the circle marker is delayed for longer intervals, after the appearance of array and bar marker, it becomes increasingly irrelevant and the task reduces to a simple readout process.

SECTION 1

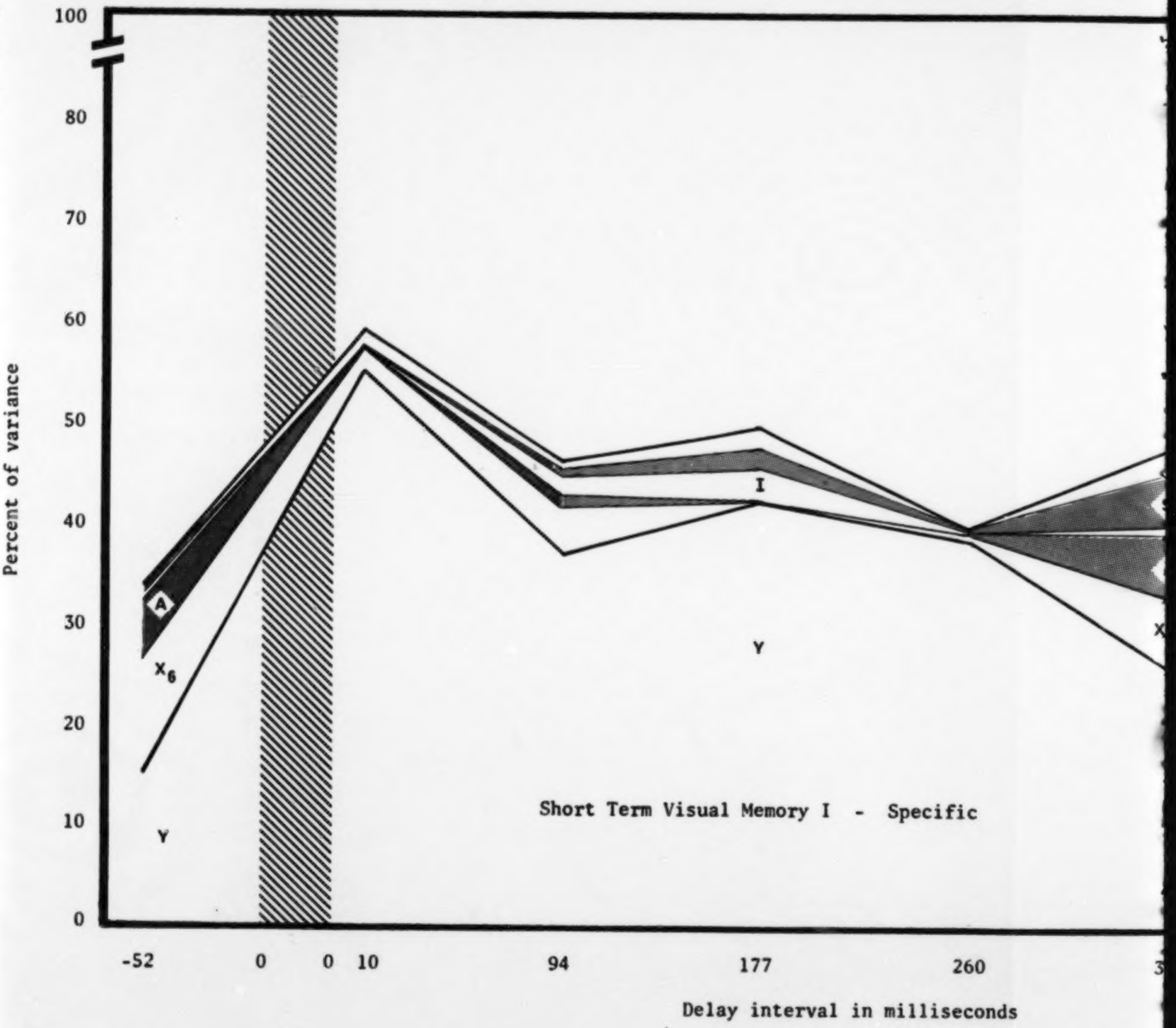
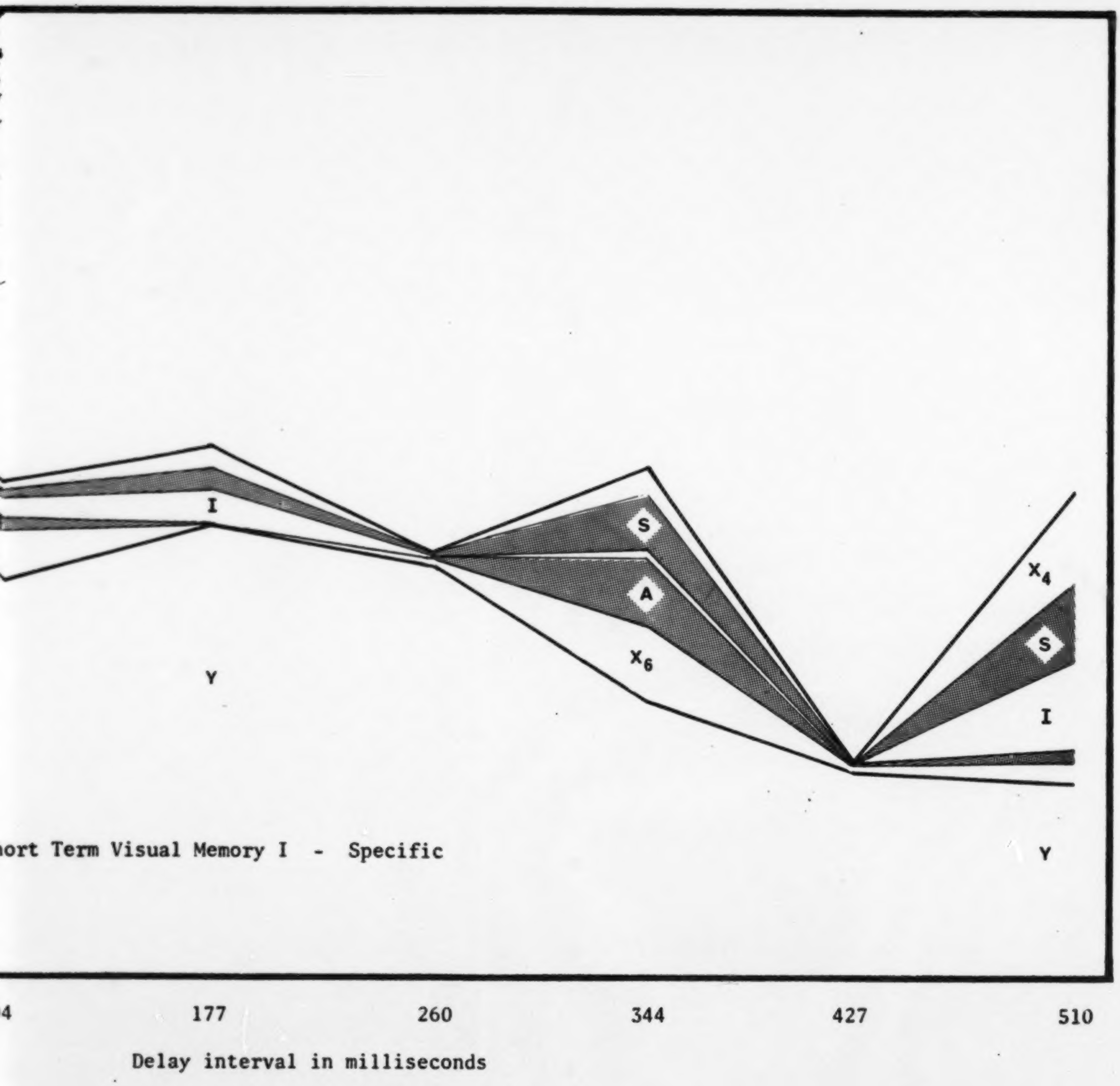


Figure 6. Percent of variance accounted for by selected factors at the eight delay intervals



d for by selected factors at the eight delay intervals of Short Term Visual Memory I.

SECTION 1

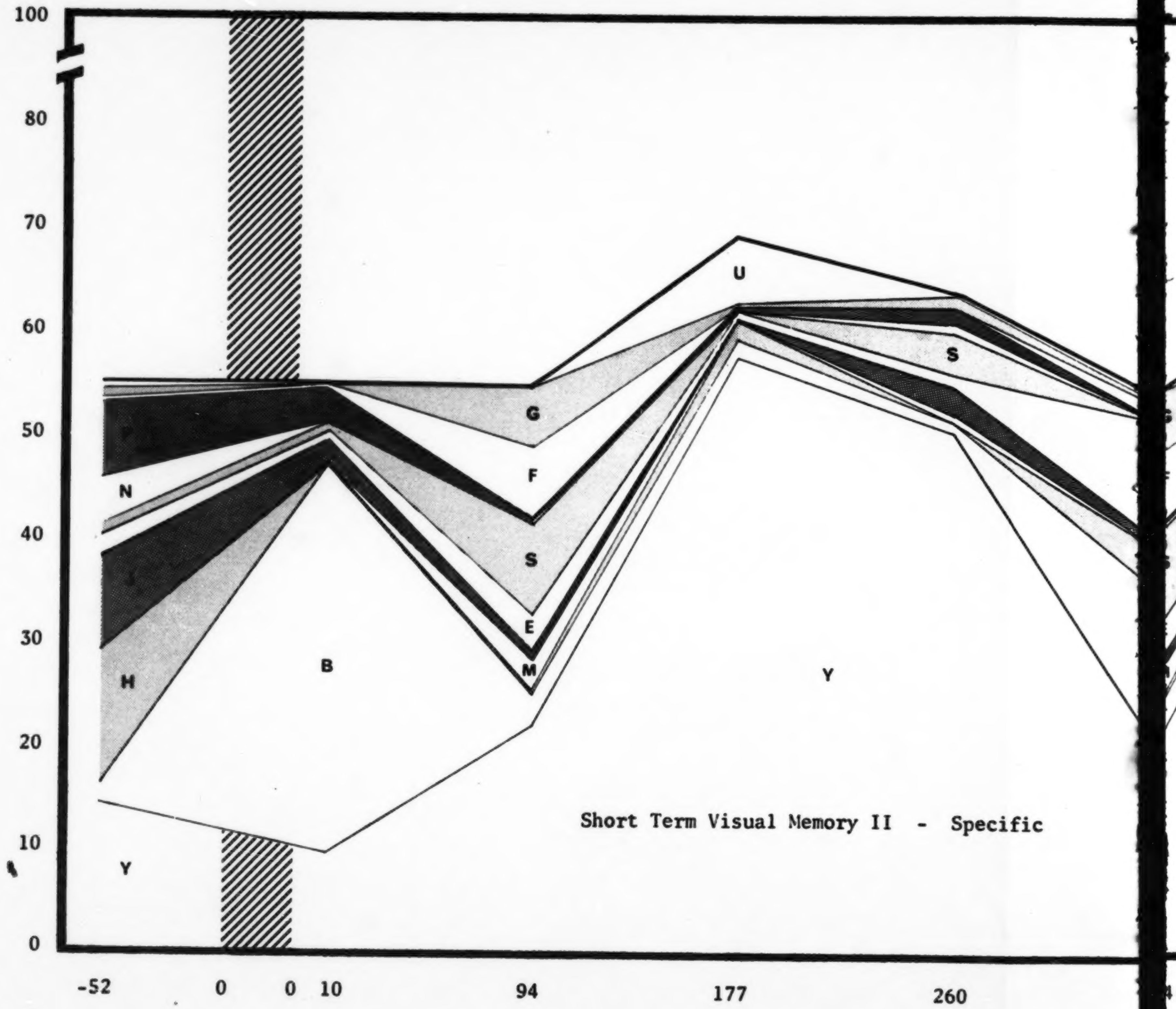
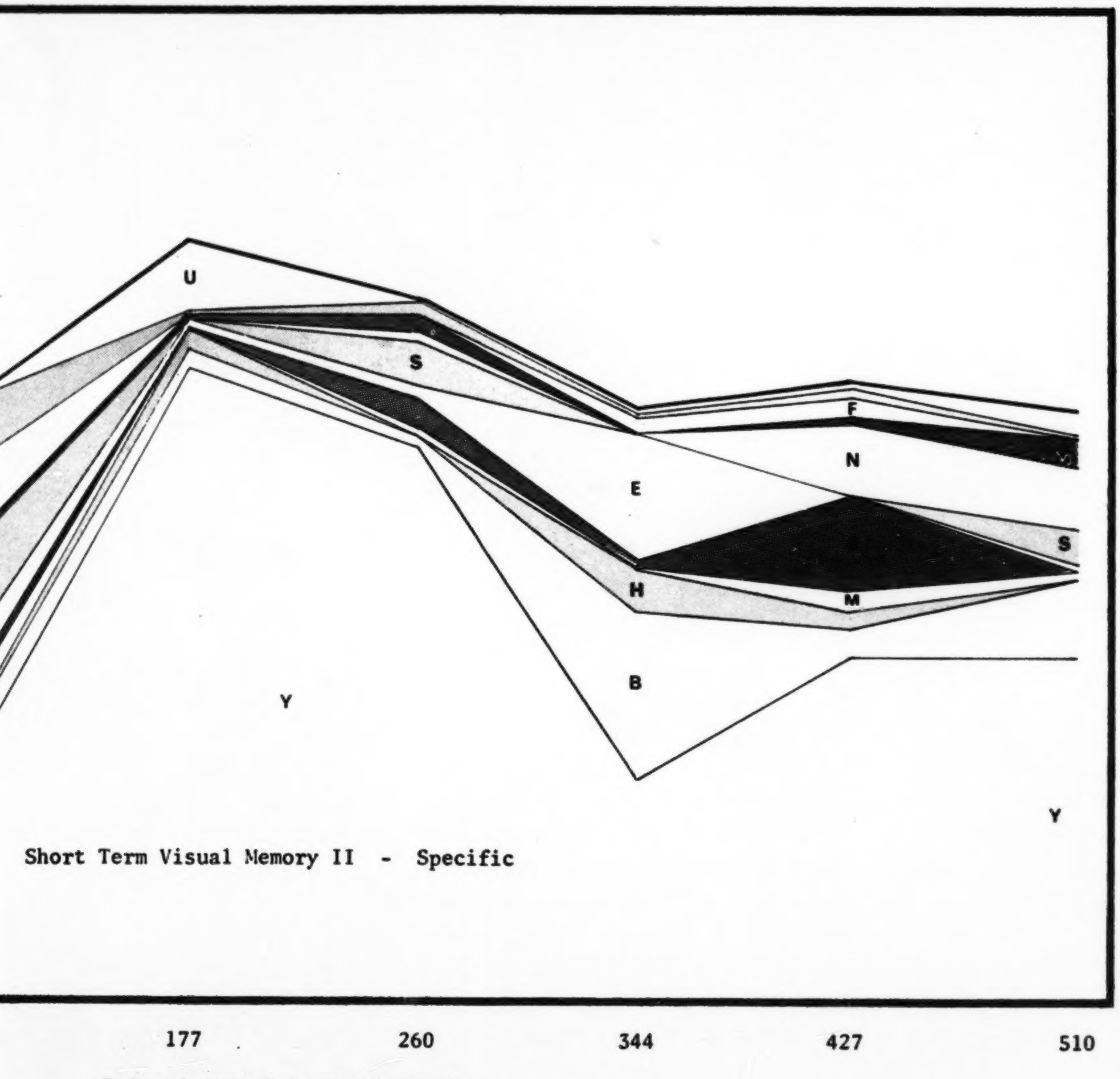


Figure 7. Percent of variance accounted for by selected factors at the eight delay interval



for by selected factors at the eight delay intervals of Short Term Visual Memory II.

SECTION 1

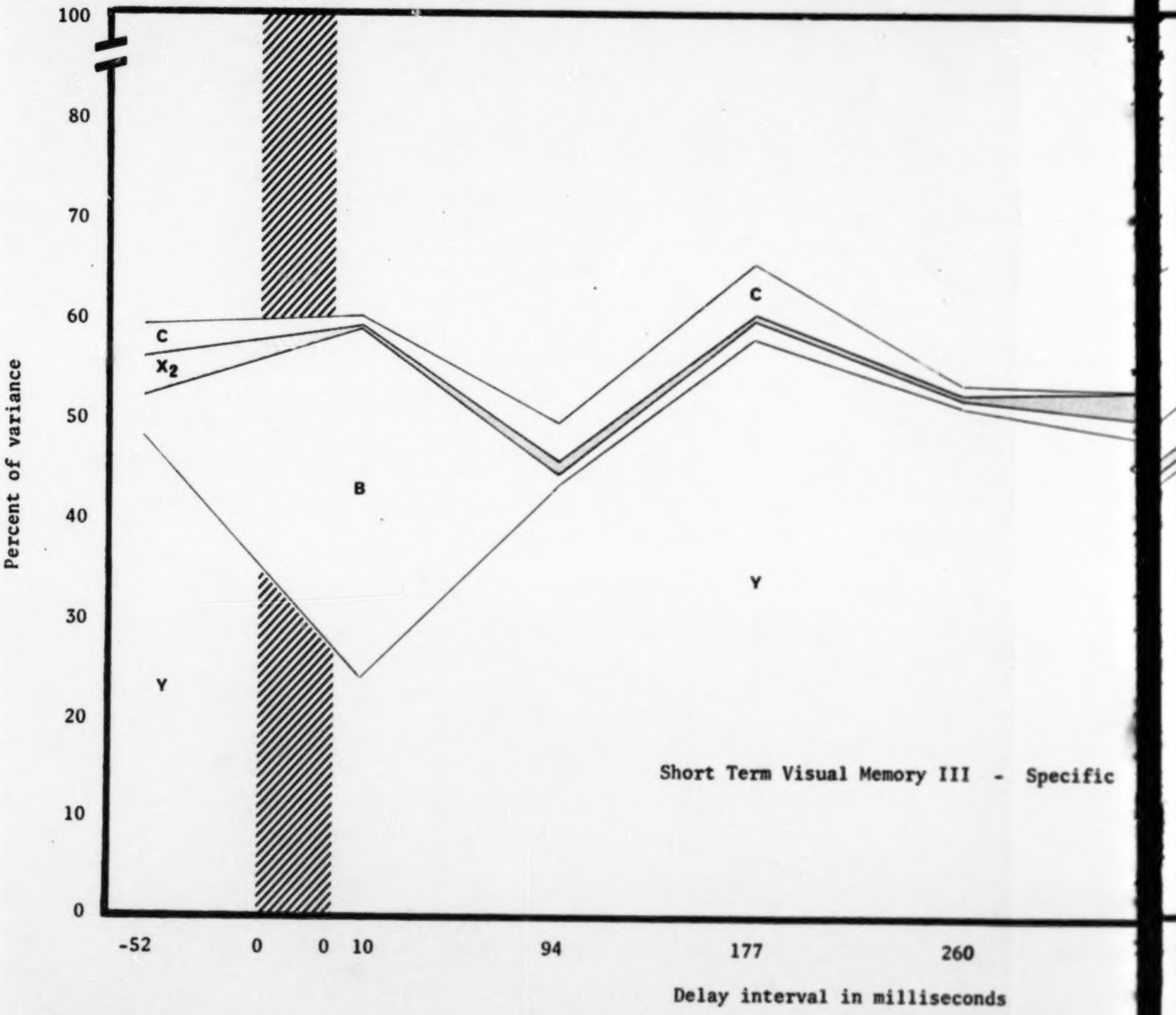
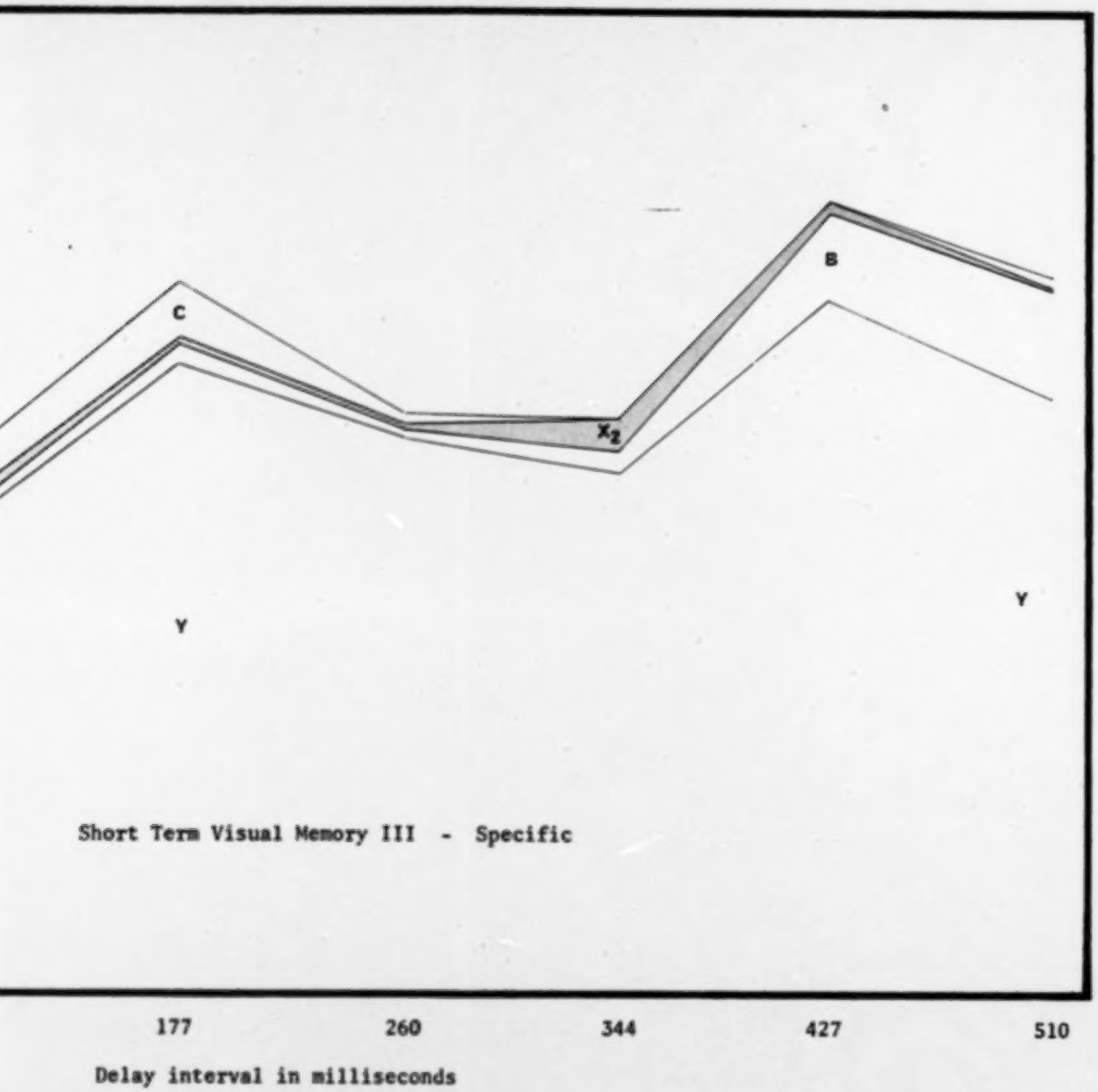


Figure 8. Percent of variance accounted for by selected factors at the eight delay interval



or by selected factors at the eight delay intervals of Short Term Visual Memory III.

DISCUSSION

The factors obtained in the present study represent, at best, an early and a tentative step toward an organization of visual cognition and memory processes. Clearly, a satisfactory organization of these processes will be a most difficult task. Furthermore, since additional related work is in progress, it is both unwise and unnecessary to attempt now an extended treatment of the processes, their nature and relationships. Further analyses of the present data and confirmatory studies based on new administrations of tests are necessary. In particular, the factorization might justifiably be carried further, with an attempt to coordinate the three problems to a single, simpler solution. Those orthogonal factors presently identified and displaying a degree of psychological meaning deserve to be rotated to an oblique solution, carried to higher orders, and transformed to hierarchical orthogonal structure. Also, since the nature of several hypotheses under consideration appropriately requires mathematical structures other than factor models (e.g., the simplex), it may be profitable to investigate the applicability of Guttman's (1965) order analysis procedures to subsets of the correlation matrices presented here. Notwithstanding the incompleteness of the present data, the intention to examine them further, and the additional work in progress, some useful suggestions and implications can be drawn from the present results.

The first noteworthy result relates to the nature of the obtained factors which consist predominantly of film tests. The most striking of these factors has been named Serial Integration (Factor B). Its emergence in all three factor problems seems clearly to depend on film tests entitled Successive Perception III and Successive Perception IV, as well as Minimal Movement, Sequential Words, Attention Span III, Motion Time Translation, and Speed Estimation. As indicated earlier, in the interpretation of this factor, the critical task characteristic shared by most tests in the factor seems to be temporal closure. The examinees received temporally spaced stimuli rapidly and were required to integrate or organize these time-separated parts into meaningful, whole cognitions. This interpretation is strengthened by the loadings for Short Term Visual Memory IIB and IIIB (10 msec. delay) and the absence of loading for Short Term Visual Memory IB, where no marker "superimposition" was involved. Another of the film test-dominated factors is Factor F, named Serial Accumulation. It, too, emerged in all three factor problems and depended principally on the film tests entitled Successive Perception I, IIA, and IIB, with further involvement of Fly*ing Orientation*. *In contrast with* Factor B, this factor appears to involve less rapid accumulation of temporally separated elements and the cognizing of relationships among the parts, with perhaps less requirement, also, for verbally or symbolically labeling the cognitions.

Factor J, Serial Detail Comparison, merits discussion as a third film test-dominated factor. In this factor, there is an apparent emphasis on the identification of figural details, with the critical details being identified through a form of serial or sequential discrimination. By resorting to examples drawn from tests in this factor, perhaps the suspected features of this process can be made clearer. In the Landing Judgment test, examinees were required to choose the point, marked A through E, on a simulated runway at which their approaching "airplane" would touch down; instructions told them to watch for an apparent expansion or outward radiation of the ground surrounding each alternative point. It would seem that examinees arrived at their decisions or choices by comparing details of the scene at one point in time with details at a succeeding point, thus eventually (or hopefully) locating the runway point for which the serial details were appropriately discrepant. In Random Shape Memory, sixteen random shapes were presented in succession, followed by 32 random shapes, with examinees required to identify which of the 32 shapes were present in the original group of 16. It would seem that examinees tended first to discriminate the 16 original shapes by seeking in each successive shape that set of details which would serve to distinguish the shape; this requires comparing serially for critical details. With this set of identified details, examinees could then seek to decide whether each of the 32 test shapes matched or departed from the discriminated details, as remembered. The serial nature of the identification of stimulus details seems equally significant in connection with performance on the test entitled Attention Span III and serves well in accounting for the presence of the other tests in this factor.

Other factors, while not dominated by film tests, have been clarified to some extent by the incorporation of one or more film test variables. Factor D, Serial Orientation, is a modified version of the print-based spatial scanning or perceptual foresight dimension. The presence of the Flying Orientation and Film Memory I tests seems to highlight the dynamic, information processing characteristics of this ability and to label it as a serial systems product, rather than an implications product, in Guilford's structure. The prominence of the Rotation II test in Factor I similarly clarifies the factor content of included printed tests. The Closure Speed test has traditionally been considered a kind of gestaltic recognition task. By its inclusion in Factor I and its exclusion from several other obtained factors, one is forced toward a more analytic, discrimination-classification, interpretation of the task. Also, the bipolarity of Factor K is suggestive of a major difference between some filmed and printed measures. The relevant dimension may be designated as active-discrete vs. passive-continuous. In general, a consideration of film test factors,or factors in which filmed and printed tests are intermingled, makes it difficult to view cognition and memory processes as distinct. The controlled manipulation of within-item stimulus events, and the temporal "space" in which these events occur, offers a powerful means for exploring the interfaces between traditional categories of intellectual ability.

Figure 9 depicts all of the factors, named and unnamed, that were obtained in the present analysis. Three factors, A. I, and G, are shown to be combinations of factors hypothesized as separate. Other solid-walled cells are labeled with their appropriate name and letter designations. These appear to have some theoretical utility, with the exception of Factor Y and possibly Factor W, which are largely specific factors. Broken-walled cells contain inadequately specified or psychologically insignificant factors. Broken-walled separations between Figural and Serial Relations and between Instantaneous and Serial Memory Span suggest that these factor pairs were not adequately

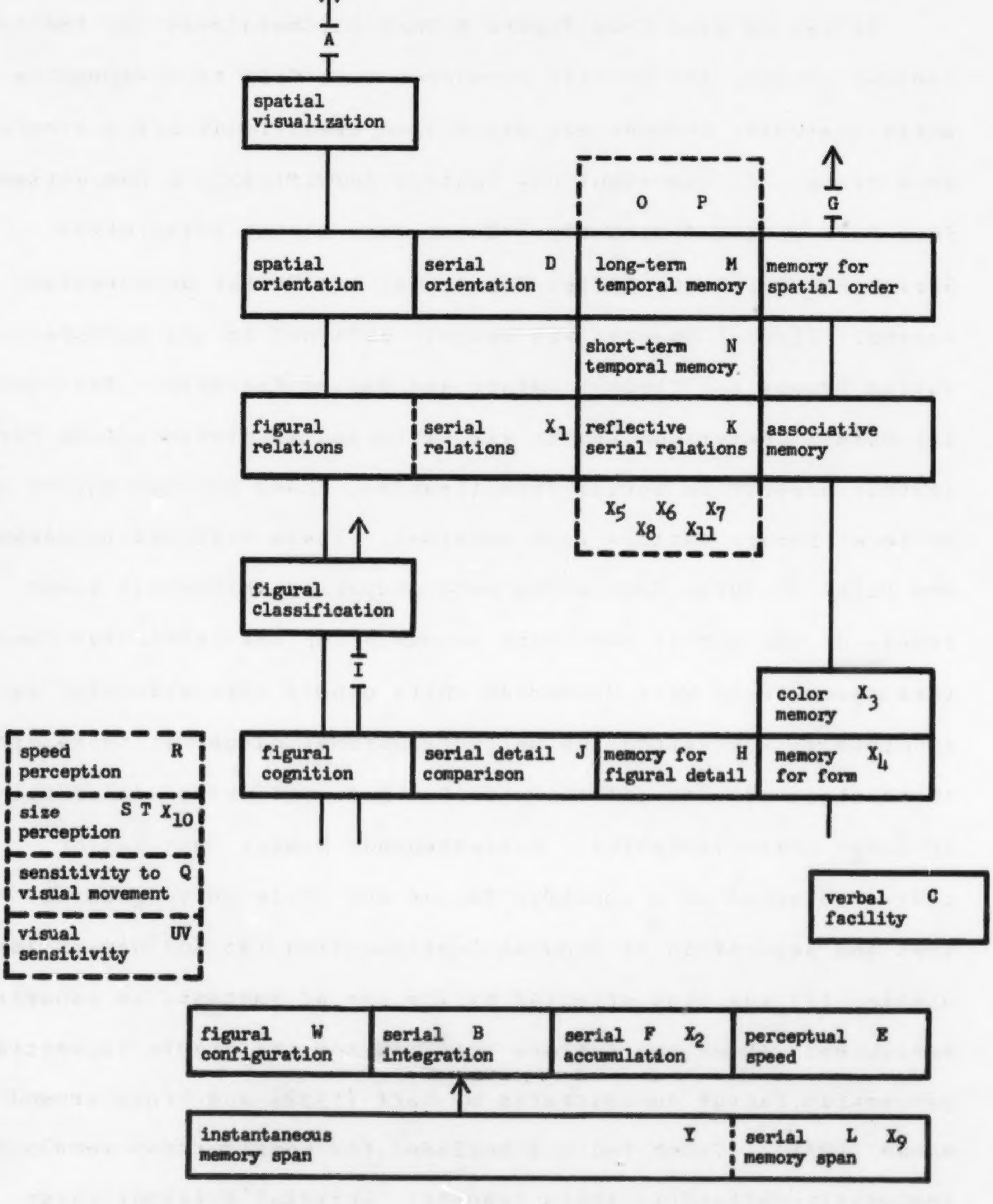

A
spatial visualization
O P
G
spatial orientation
serial orientation D
long-term temporal memory M
memory for spatial order
short-term temporal memory N
figural relations
serial relations X_1
reflective serial relations K
associative memory
X_5 X_6 X_7 X_8 X_{11}
figural classification
I
color memory X_3
speed perception R
size perception S T X_{10}
sensitivity to visual movement Q
visual sensitivity UV
figural cognition
serial detail comparison J
memory for figural detail H
memory for form X_4
verbal facility C
figural configuration W
serial integration B
serial accumulation F X_2
perceptual speed E
instantaneous memory span Y
serial memory span L X_9

Figure 9. Revised operation hierarchy including all obtained factors.

distinguished by the analysis.

It can be seen from Figure 9 that the base rows and the two central columns are heavily dependent upon film test variables, while the outer columns are based upon traditional printed reference tests. Of the eight new factors specifically hypothesized, four were obtained directly. These were Serial Integration, Serial Accumulation, Serial Relations, and Serial Orientation. Another, Figural Memory, was roughly obtained in the factors called Memory for Figural Detail and Memory for Form. The Serial Detail Comparison factor was extracted as distinct from Perceptual Speed. No Serial Visualization, Speed Perception, or Behavioral Memory factors were obtained. Tests designed to measure the first of these dimensions were dispersed throughout lower levels of the serial cognition column. For the latter two factors, some tests were dispersed while others were extracted as singletons, suggesting the multidimensional nature of these hypothetical constructs and the need for more intensive exploration of their characteristics. Instantaneous Memory Span was of course obtained as a specific factor and it is quite possible that the separation of Figural Configuration (W) and Serial Accumulation (F) was also effected by the use of subtests as separate variables. These two factors here replace the single sequential perception factor demonstrated by Roff (1952) and Fruchter and Mahan (1952). Other factors included for confirmation were not adequately defined in these results. Christal's (1958) color and spatial memory factors combined, with associative memory, to form Factor G. Since some of these tests contain dependency relations, this combination may be artificial. The previously obtained sensitivity to Visual Movement factor was largely disintegrated and no single size perception factor was found. Christal's Temporal Order Memory factor, however, seemed to be represented here in two weakly defined factors (M and N).

With regard to the general hypotheses formulated initially, some characteristics of these results are suggestive, even though extremely tentative. Factor A, and to a slight extent Factors G and I, illustrate the general form of the operation hierarchy hypothesis. Similarly, the serial nature of many obtained factors lends support to the notion of operation series. The rows and columns of Figure 9 have been designed to suggest a dynamic lattice. However crude at present, the lattice model appears useful as a guide for further exploratory, and possibly confirmatory, analyses. The visual imagery and incidental learning hypothesis must, for the most part, await further analyses of these data, now being planned. Nevertheless, a few suggestive results are worthy of note. First, the five Christal tests designed as measures of incidental memory appeared in Factors G, D, M, N, and X_3. Other Christal tests, expected to involve visual imagery, were found in Factors G, J, K, I, and X_4. Of these, only Factor I contains an explicit trace of verbal abilities. Factor X_4 includes a negative loading for the Concealed Words test. In a higher-order analysis, it is possible that the dimensions identified above, together with several others, might combine to provide the hypothesized imagery cluster. In fact, symbolic and verbal content measures were found to be isolated within only a few factors in the analyses so far completed and film tests seemed not to involve such abilities, with one potentially important exception.

The division of the two tests entitled Film Memory I and

Film Memory II into Factor D, Serial Orientation, and Factor C, Verbal Facility, deserves additional comment. So far as can be seen, there is nothing substantial which differentiates the two tests, except their order of administration and the accompaniments of this order. Nevertheless, Film Memory I emerged with significant loadings on a factor which suggests spatial scanning or the rapid serial processing of spatial images, while Film Memory II emerged with substantial loadings on the Verbal Facility factor. These loadings and the striking differences in the two factors involved suggest that the processes utilized in making decisions on the two tests were by no means comparable. They further suggest that the adjacent administration of the tests heavily influenced the outcomes. For Film Memory I, the examinee's task was only vaguely indicated and did not become less vague until the examinees saw the test questions, following the screening of the brief live action scene. They were thus in no position to be selective in their storage of the scene's contents. However, when presented with the same vague instructions for Film Memory II, and just moments after completing Film Memory I, examinees could reasonably predict that this new task would be like the one just completed. Making such a prediction, the examinees could resort to selective recall of the new projected scene. The results suggest that the examinees, or fair numbers of them, resorted to selective verbal labeling of what they witnessed.

The comments above suggest, for example, that if the administration order of the two tests, Film Memory I and II, were reversed in a subsequent and similar study, the test administered second in the order would continue to load in a verbal facility factor, while the first-administered test would not. This account of the results seems related also to a discussion of incidental learning, as presented recently by Deese (1964). He first suggested that his hypothesis was naive and almost certainly wrong, but then proceeded as follows:

> Instructions to learn (or to memorize) produce a set to emit "representational" responses to the material presented. These representational responses are responsible for the encoding of the presented material...The identifying code for a linguistic stimulus is, by definition, identical in form to that stimulus. The code for a picture or an abstract form, of course, is not. Nevertheless, a verbal code for such a stimulus may serve as a device for remembering the salient features of the stimulus...Instructions to learn, then, produce appropriate representational responses during presentation of material; conditions of incidental learning must also produce some such responses, but these are fewer in number. (pp. 203-204)

The outcomes with respect to the tests Film Memory I and Film Memory II bear a further resemblance to some statements from George Miller (1956) in which he discusses recoding during human information processing. He wrote:

> ...that recoding is an extremely powerful weapon for increasing the amount of information that we can deal with. In one form or another we use recoding constantly in our daily behavior.
>
> In my opinion the most customary kind of recoding that we do all the time is to translate into a verbal code... When we witness some event we want to remember, we make a verbal description of the event and then remember our verbalization. Upon recall we recreate by secondary elaboration the details that seem consistent with the particular verbal recoding we happen to have made...In particular, the kind of linguistic recoding that people do seems to me to be the very lifeblood of the thought processes. (p. 95)

In short, we would suggest that the verbal codes of Deese or the verbal recoding processes of Miller were used restrictively, if at all, by the examinees during the administration of the test entitled Film Memory I, but were substantially used by examinees in the processing of information from the similar and subsequent test entitled Film Memory II. There are several implications of this suggestion which deserve to be tested, including the effects produced by reversing the present administration order, of altering the specificity of the test instructions to examinees, and perhaps of inserting a similar and third test into the first position of administration order.

Although the writers are encouraged by the principal results of this study and by the apparent characteristics of the several tests specially prepared for inclusion in the study, they recognize several shortcomings of these tests. Even as research instruments, some tests are marginal and deserve to be refined. For those tests to which customary item analysis procedures can be applied, some additional work should be undertaken to identify and eliminate non-functioning items and, generally, to provide for more efficient measurement within the time allotted. This refinement will also need to provide for the preparation of additional items and, in some cases, the extension of the time currently allotted to specific tests. There is a further and smaller need to improve the film techniques incorporated into a few of the tests. Of those prepared, two or three, including the test entitled Story Frames, do not project well and they provide screen images which are less visible than desired. These problems seem minor and require simple corrections which the techniques of film production can readily provide. So, although there is much room still for the refinement of the specially prepared tests, they were at least adequate for the purposes of the study and they have served to demonstrate again the feasibility of preparing and using a wide variety of such unconventional tests. Such feasibility demonstrations might seem to be unnecessary at this late date, but the sparseness of the related literature indicates otherwise. Many problems of human information processing, examined either as problems in individual differences, as experimental problems in which individual differences are submerged, or as both differential and experimental questions, can be easily, almost ideally, accommodated through the use of stimulus materials in the form of motion pictures.

Some years ago, Thurstone commented on Schmidt's test of color-form dominance and referred to it as "...the most ingenious test that I have ever seen." (1953, p. 5). The Schmidt test used colored forms arranged in the circumference of a circle and, during successive exposures of the forms, any given form might appear to shift in a clockwise direction, while any given color might appear to move counter-clockwise. It is of interest to note that Schmidt's original test, the one to which Dr. Thurstone referred, was rather laborious to administer and required individual administrations, but that essentially the same test was subsequently prepared in the form of a motion picture, with no apparent loss of the test's original virtues and with the gain of repeatable, almost automatic group administration.

Many other tests, perhaps equally ingenious, can be readily prepared simply by employing the capabilities which motion pictures make available to all who would use them. The film medium can accommodate contents which Guilford would classify as figural, symbolic, semantic, or behavioral. Item content may be auditory, visual, or both, with the information in two channels either competing or complementing, either alternately or concurrently, for brief, intermediate, or extended durations. Pace, rhythm, and motion can be employed as critical characteristics of the item stimulus. In addition, since item exposure is controlled and, typically, has the same specifiable onset time for all examinees, there are new opportunities for studying several types of unconventional examinee response, including latencies and physiological responses to the single item. Finally, as demonstrated with the tests in the present Short Term Visual Memory series, many questions which normally interest the experimentalist may now be examined in the context of individual differences. In short, it appears that numerous "ingenious" tests are waiting still to be developed and to be studied by those who would use even the most obvious characteristics of the motion picture medium. Some improvements in the understanding of human information processing may well emerge from the exploitation of these possibilities.

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